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ORIGINAL ARTICLES.

THREE TYPES OF CEREBRAL SYPHILIS PRODUCING MENTAL DISEASE.

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THE effects of the syphilitic poison upon the brain are so variously expressed that it is important to remember that mental disease is, at times, produced by syphilis without any physical symptoms being present to aid us in diagnosis. This is now a too well-authenticated fact to need particular emphasis. That syphilis is frequently overlooked, however, in cases of beginning insanity there is much reason to believe, and I will cite a case in which only the accidental discovery of the fact that the man had previously contracted syphilis led to correct therapeutics. In certain rare cases of simple mental disorder following syphilis there is no local pain, convulsions, or significant cranial-nerve spasms or paralyzes to indicate the presence of a gross lesion, and a clear specific history or the therapeutic test alone will indicate the real cause.

Commonly, however, the proofs of the existence of organic lesions of the brain or its membranes are not wanting, and a cranial-nerve palsy or spasm, a convulsive seizure, a sudden or gradual attack of hemiplegia, or violent local head-pain, with, perhaps, other neuralgic symptoms, will make us suspect that syphilis is the true cause of the patient's mental disorder. It is generally said that any form of mental disease may be the result of syphilis, and yet the rôle that the latter plays, particularly in the production of general paralysis of the insane, has been, and is to-day, still wholly unsettled, some authors rating it as a very prominent, and others as a comparatively insignificant, cause of that affection. That syphilis can produce a form of general paralysis which is curable is admitted by many. In connection with this, Professor H. C. Wood¹ writes:

"In conclusion, I may state that it must be recognized as at present proved that syphilis may produce a disorder the symptoms and lesions of which do not differ from those of general paralysis; that true general paralysis is very frequent in the syphilitic; that the only constant difference between the two diseases is as to curability; that the curable sclerosis may change into or be followed by the incurable form of the disease."

This view is also held by Griesenger, Mendel, Foville, Esmarch, Legardelle, Lamet, Rollet, and many other prominent clinicians. Another school maintains that the encephalopathies produced by syphilis are distinguishable from true general paralysis.

Therefore, although the question cannot be considered to be settled, still, in reading over the literature of this subject, it would seem that the burden of proof rests with those who, with Professor Wood, consider the syphilitic form indistinguishable from true general paralysis. Assuming this to be the case, the recognition of the presence of syphilis is, in all incipient cases of general paralysis of the insane, very important, and in all doubtful cases specific treatment should be adopted as the therapeutic test between the two forms of the disease.

Syphilis is, however, so constantly thought of in connection with general paresis that probably it very rarely escapes recognition, and I believe it is in the case of less marked psychoses that it is more likely to be overlooked as an etiological factor. The frequent inability to get a true history of the case and the remote period at which symptoms may occur are additional reasons for very careful exclusion of the syphilitic diathesis in all cases of obscure origin. In some cases that I have seen during the past two years the recognition of syphilis as the true cause of the mental disease has resulted in a complete cure of the patients, who, otherwise, were undoubtedly doomed to hopeless dementia; and the impressions received from the observation of those cases form the subject of this paper. It would seem, therefore, that the point cannot be too strongly insisted upon that, when rather atypical mental symptoms appear in a subject over twenty-five years of age, the presence or absence of syphilis should, if possible, be determined, especially when other apparent causes are wholly wanting, and that the therapeutic test should be applied, if syphilis cannot be otherwise excluded. No harm can be done to the patient by its careful application, and, if syphilis should be present, there will be, in the majority of cases, the most gratifying amelioration of all the symptoms, and perfect cures are by no means rare.

In the cases of syphilitic brain-disease that have come under observation in the New Jersey State Asylum a comparatively large proportion have exhibited a progressive dementia. In two cases this

¹ Nervous Diseases and their Diagnosis, p. 465.

was very marked, and closely resembled an attack of that rare mental disease, primary dementia. There did not appear to be anything in the condition of these two cases to distinguish them from primary dementia. So that while differential points may be entirely wanting between certain cases of syphilitic psychosis and acute primary dementia, in the former there will usually be the history of syphilitic infection and the absence of any obvious exciting cause, such as sudden grief, fright, remorse, or exhausting illness. The different periods of life in which these two affections occur will also guide us; for, while primary dementia usually occurs before the age of twenty-five years, syphilitic mental disease is far more common after that age. Sex, also, should be considered, males being more subject to syphilis, while sex exerts little influence in the causation of primary dementia. These distinctions are by no means fixed, and the diagnosis between the two conditions must at times be difficult. Still, the above considerations usually furnish valuable hints as to the probable diagnosis, and combined with the therapeutic test they furnish a fairly adequate line of reasoning.

The following cases are taken almost at random from my notes, but they may serve to illustrate some types of syphilitic mental disease, other than general paralysis of the insane, which, I have reason to believe, are of quite frequent occurrence:

CASE I.—Mr. R., aged forty years; married; native of New Jersey. Admitted, April 15, 1890. No hereditary predisposition to nervous or mental disease. No history of syphilis could be obtained on admission. His attack had commenced two months before with melancholia and a "numb feeling" in the head.

At the time of his admission his physical condition was good, and no local disease could be discovered. His mental condition was one of listless apathy; he would sit for hours with a perfectly expressionless face; he answered questions slowly and aimlessly, and appeared to take very little interest in his surroundings. He failed to comprehend conversation well, his replies being at times irrelevant and meaningless. After being aroused by a question he would immediately relapse into silence, with the same dull, vacant stare, and the eyes looking straight forward. It was learned that he had had an attack of "grippe" some time previously, and that at two periods—six and two years ago, respectively—he had had slight attacks of melancholy, which were attributed to some domestic trouble.¹

For two months succeeding his admission he grew worse, dementia became more marked, and the probable diagnosis of primary dementia was made, when by accident it was discovered that the man

had acquired syphilis. He was at once given potassium iodide, commencing with 30 grains three times daily and rapidly increasing the dose until 1 drachm three times daily was taken. He was kept upon these doses for a time, but at present he is taking 15 grains three times daily. The effects of this treatment were marked, and the improvement in the mental condition could be noted from day to day. Memory came back slowly, but surely; the face took on expression, and reasoning and judgment returned. He began to converse freely and intelligently, and the "slightly dead or numb feeling" in the head coincidentally disappeared. To-day he considers himself in about his usual health, but he will continue to take the iodide for some time to come. In this case the mental disease corresponded exactly to some cases of primary dementia which have occurred here.

The next case exemplifies a more frequent type. In the preceding case a peculiar, drowsy dementia, with slight "numb feeling" in the head, were the only symptoms; but the class of patients of which the following is an example give a history of sudden or gradual hemiplegia, with or without aphasia, and if not preceded, usually followed, by convulsive phenomena. To what extent the mental symptoms are due to direct irritation from gross lesions, or, on the other hand, to a direct action of the syphilitic virus on the brain cortex, can only be conjectured, and it is of no practical importance to determine, for, with our present knowledge of the subject, there can be but one rational treatment for such cases.

CASE II.—Mr. S., aged thirty-one years; married; has no children; native of New Jersey; fairly educated, and a clerk by occupation.

Admitted, April 15, 1889, with the following letter from his physician: "Patient underwent treatment for primary syphilis about four years ago. One year ago he had a stroke of paralysis during the night, after a hard day's work, and since then has shown, at times, signs of mental derangement. The power of speech has not been good since then, and there is a tendency to cry and to be forgetful, and, of late, mental confusion and an inclination to wander away from home. He has also threatened suicide."

Examination on admission showed the following conditions: Medium-sized man, of light complexion, with pale, relaxed features and soft, flabby muscles. The left pupil was slightly smaller than the right. Field of vision, ocular movements, accommodation, and color-sense good. There was difficulty in speech, the pronunciation being jerky, uncertain, and irregular. The tongue protruded nearly straight, but was tremulous and clumsy in movement. There was inability to select proper words quickly, but if time were given the patient he could usually complete his thought. The right arm and leg showed marked incoördination of movement and a slight paresis of this side when compared with the left side of the body. A pin was picked from the floor awkwardly, and his writing

¹ Since the recovery of the patient he has informed me that those attacks were due to the knowledge that he was the victim of syphilis contracted eight years before his admission here.

was almost illegible, but the spelling was correct. The patellar-reflex was highly increased on the right side and slightly so on the left side. The sensations of pain, heat, and cold seemed normal.

The mental condition was one of melancholia mingled with a considerable degree of dementia. Memory was lost for recent events and much impaired for remote ones. He seemed to be in a hopeless, dazed, emotional state, with, at times, mental hebetude approaching complete dementia. He could, however, be readily roused into conversation, which he would, sometimes, carry on in a fairly intelligent manner. For several months prior to admission he had been wholly unfit for business, and frequently wandered off to distant cities, where he would be found, unable to explain his curious conduct. He had no delusions.

He was immediately given 30 grains of potassium iodide with $\frac{1}{4}$ grain of bichloride of mercury three times daily. During the first two months of treatment he showed little improvement, and had four convulsive seizures, affecting the right side of the body. After these seizures the aphasia and the incoördination and paresis of muscles were decidedly worse. The convulsions were ordinary epileptiform attacks, and were attended by no further eye-symptoms than those already noted. After this period the convulsions did not recur, and rapid improvement began. The mind cleared, speech became easy and natural, and the incoördination and paresis almost wholly disappeared from the right arm and leg. He remained under treatment three months after he considered himself fit for business, and was discharged, practically cured, December 14, 1889. I have since frequently heard from him, and he is still well and attending to business, having had no return of his mental or physical troubles. At his discharge he weighed thirty pounds more than on admission, his muscles were hard and complexion ruddy, notwithstanding the large doses of the iodide. The mercurial was omitted from the treatment after four months, when decided improvement had begun, and the potassium iodide was increased until, at one time, he was taking 200 grains daily. Regular out-door exercise constituted an important element in treatment while the patient's mind was returning to its normal condition. At no time did symptoms of salivation or iodism appear.

The case just detailed is instructive in showing the good effects of long-continued large doses of anti-syphilitic remedies in such cases. Had the treatment been abandoned as useless after the first two months, during which time convulsions and no perceptible improvement gave a hopeless aspect to the case, it is only fair to presume that the patient would have gone rapidly downward, and that a long terminal dementia, or death from exhaustion or in a fit, would have been the end. Hence, persistent treatment should be adhered to for months, even if improvement does not occur.

The last case that I will describe is one of a class

having very definite symptoms of organic lesions, which usually appear gradually, and may be preceded, accompanied, or followed by mental disease. The case also illustrates the remarkable improvement which will sometimes follow huge doses of specific remedies under apparently desperate circumstances. Another important lesson taught by this case is that death is frequently due to neglect of treatment, which, in the present instance, afforded us an autopsy. There is no doubt that a final recovery would have occurred in this case also, had his medicine been continued for a sufficient length of time. The failure to carry out treatment is a frequent cause of relapse in such cases, and patients cannot be too emphatically told of the risks they run in neglecting to follow a long course of treatment after all active symptoms have passed away.

CASE III.—Mr. C. Y., aged thirty-nine years; native of New Jersey; a plumber by occupation, and with no trace of mental or nervous disease in his family history. His previous diseases were only those incident to childhood and youth. He contracted syphilis at about the age of thirty-four years.

Thirteen months before admission he began to show mental symptoms consisting of causeless melancholy, unstable temper, with emotional periods, when he would cry over some imagined woe. He became restless, roamed about the town, and worked only fitfully at his trade. He was utterly disheartened, especially in the mornings. With these symptoms, memory rapidly failed, and at his admission to the asylum, November 5, 1888, it was almost entirely gone. He also lost in weight. On June 7, 1888, he had a slight stroke of paralysis, affecting the right side, and after this, mental deterioration was more rapid. He imagined that his mother was dead, and various other delusions also occurred at this time.

For the following notes of his condition, shortly after his admission, I am indebted to my friend, Dr. L. L. Mial, under whose care the patient was, until December 1, 1888, when I first saw the case. Dr. Mial informs me that, beginning with violent pain in the left frontal region, there was progressive paralysis, occurring as follows: Partial ptosis of left eyelid, gradually becoming complete, accompanied with external strabismus and, later, with dilatation of the pupil of the same eye; then paresis, deepening into paralysis, of the left arm, and after the arm, the left leg became similarly affected. Sight remained good. Sensation was normal. The face and tongue were unaffected. His speech-memory was absent. Dr. Mial placed the patient on the mixed treatment, and by the time he came under my care, December 1, 1888, he had nearly recovered from his paralysis, and intellection was fairly good. The treatment was continued, and two months later he passed from observation, nearly cured mentally and physically.

Through neglect he did not continue to take the remedies prescribed, and he returned, March 1, 1889, with extensive paralysis, which had com-

menced a few days previously. First, the left arm became "numb," and memory completely failed; on the following day the left arm was completely paralyzed, and the left leg was "very cold," while, at the same time, the right arm showed decided weakness. On the third day the bladder was paralyzed and the right arm was flaccid, and the day following the development of these symptoms the right leg was paretic. On March 7, 1889, the man was almost completely paralyzed, the only exceptions being the face and tongue, and the right leg, which could be very feebly moved. Elsewhere the paralysis was perfect and complete. Rapid emaciation had occurred prior to the paralysis, and on admission he was in a very feeble condition. He was placed upon general tonics, with stimulants and potassium iodide 40 grains, with biniodide of mercury $\frac{1}{10}$ grain, three times daily.

March 11. Right hand can be feebly extended. Urine drawn. Iodide increased to 50 grains three times daily. Areas of anæsthesia were noted over chest and abdomen and left extremities.

16th. Moves right arm, hand, and leg slightly, and slight voluntary movements of left hand can be performed. Left leg still completely paralyzed. Pupils nearly equal in size, but the right is slightly more dilated than the left; both react to light. Temperature, 99° – $102\frac{1}{2}^{\circ}$. Pulse weak, 100, and occasionally drops a beat. Urine acid; specific gravity 1020; no albumin or casts; contains excess of phosphates.

19th. Power in right side increased. Left arm can be raised from the bed, but movements of the wrist or fingers are not performed. Mental condition is one of stupor, from which he can be easily roused and made to answer questions intelligently. Memory totally gone; cannot remember my name longer than two or three seconds. Biniodide of mercury omitted from treatment. Tongue, heavily coated, is protruded well, and does not deviate. Fever continues. Sight remains unaffected.

31st. The same amount of fever and paralysis.

April 4. Muscular power is fairly good on right side, and there has been decided gain in left arm. Wrist- and finger-movements are now feebly performed. Pupils equal and of about the normal size. Bedsores forming.

18th. No change in paralysis. Abscess of right thigh evacuated of about a pint of apparently gummatous pus. Extensive bedsores. Patient failing.

25th. Patient died to-day, from exhaustion.

Autopsy: Calvarium very thin and brittle, diploë diminished. Dura abnormally adherent to the bone. A slight excess of cerebro-spinal fluid. No marked atrophy of brain, and no gross lesion of the cortex. Weight of brain, 41 ounces. In the left hemisphere, and involving the anterior third of the optic thalamus, was an area of bright reddish-yellow pigmentation surrounding a dark centre, the whole being nearly the size of a silver dollar. The dark centre, the size of a five cent piece, was situated in the anterior end of the optic thalamus, and consisted of broken-down brain-substance infiltrated with blood, and, under the microscope, disorganized brain-tissue, blood-coloring matter in masses, and

the products of fatty metamorphosis were seen. In the left crus, just above and including the point of exit of the third nerve, was a patch of similar color, but without any broken-down area, the deep pigmentation being the only macroscopic appearance. Microscopically, abundance of pigment-granules, with numerous round-cells infiltrating the area, were seen. The nerve-fibres appeared to be separated in places by aggregations of these cells. No notable destruction of the fibres was detected.

In the right hemisphere, just beneath the floor of the lateral ventricle and between the optic thalamus and the caudate nucleus, was an abscess, three-quarters of an inch antero-posteriorly and half an inch in width. This involved the anterior extremity of the optic thalamus only to the extent of a line, and was thus situated somewhat more anteriorly than the lesion on the left side. It involved the fibres of the anterior segment of the internal capsule from the knee forward for a distance of three-quarters of an inch. The abscess was about three-eighths of an inch deep. Surrounding it was an area of red softening about three lines wide, and outside of this zone was another of bright reddish-yellow pigmentation exactly similar to the condition found in the left hemisphere. Microscopically, the contents of the abscess were found to consist of compound granule-cells, broken-down nerve-tissue, pigment-granules, and granular debris, with cells resembling ordinary pus-corpuscles.

With the exception of increased adherence to the bones of the skull and a little thickening along the vertex, the dura was normal.

The arachnoid was generally slightly opaque. The pia was not adherent to the brain-substance anywhere and presented only increased vascularity. The brain-substance, and particularly the cortex, were congested. No other gross lesions were discovered in the brain-substance.

The vessels showed marked thickening of the internal coat, and the left, middle, and anterior cerebral arteries were especially affected. In places the calibre of the vessels was notably diminished.

The post-mortem changes found in this case would seem to explain fully the paralytic symptoms that existed during life. The remains of the lesion of the left crus, revealed at the autopsy only by deep pigmentation and the results of what apparently had been an inflammatory condition, probably originated from the extensive disease of the vessels—syphilitic endarteritis. The three lesions found seemed exactly similar in nature and differed only in degree. The one in the right hemisphere was the most destructive, producing an abscess; the one in the left hemisphere was of less serious consequence to the brain-substance, a small necrotic area in the anterior part of the optic thalamus being its result, while the appearances around both of these lesions were identical and corresponded exactly to

¹ Microscopical examination of the cortex has not yet been completed, but will probably appear in the next annual Pathological Report of the New Jersey State Asylum for the Insane.

the area of the left crus which has been described. Whatever the process of formation of these lesions—and the appearances certainly strongly indicate the presence of at least a reactive inflammatory process—there can be little doubt that the attack of ocular paralysis on the left side, with left brachial monoplegia, was due to the lesion in the crus, with, of course, the possibility that at the same time the lesion in the right hemisphere also participated in the causation of the left-arm paralysis. The prompt treatment which the patient underwent at that time apparently had the effect of so modifying the crus-lesion that nerve-conduction was restored, as was shown by the disappearance of the paralytic symptoms and the patient's recovery at that time. The nearly symmetrically situated lesions of the hemispheres sufficiently explain his last and fatal attack and the bilateral paralysis. While the left arm regained a little motion, the left leg remained completely paralyzed until death; this is interesting in view of the more extensive lesion of the right internal capsule, half the diameter of which must have been included in the abscess-cavity. That the right side recovered power is only what would be expected in looking at the lesion of the left side, which scarcely interfered with the internal capsule, except by a zone of pigmentation.

The local severe frontal pain, complained of during his first attack, in November, 1888, is not explained by the post-mortem examination. Reasoning from the appearance of the lesion in the right hemisphere, and from the crus-lesion, which was evidently older, I am inclined to the belief that the latter was mainly responsible for the symptoms occurring in November, 1888, and that the two other lesions were coincidentally developed, the right one being more extensive and serious in its effects upon the brain. Taking into consideration the extensive arterial lesions present, it does not seem unlikely that the primary pathological process was thrombosis, with secondary reactive inflammation and softening. This view is somewhat supported by the symmetry of the lesions.

These three cases, I think, are pretty fairly illustrative of the types of syphilitic brain-disease combined with mental disease to which I have referred. Other syphilitic manifestations, of course, occur in conjunction with insanity, and I have selected these three types only because common ones, and also because they illustrate the good effects of early and persistent anti-syphilitic treatment. The class of cases illustrated by Case I., and, to a less degree, by Case II., would seem the most important from the standpoint of diagnosis, for early treatment is all-important as regards the cure of the patient. In many cases sudden hemiplegia is the first symptom noticed by the patient, and when this occurs in a

comparatively young man there is reason for suspicion.

The practical conclusions suggested by the observation of these cases are as follows:

1. That primary mental disorder following syphilis can often be completely relieved by energetic anti-syphilitic treatment.
2. That it is of vital importance that the patient continue under treatment for not less than one year after active symptoms have ceased.
3. That in some cases of bilateral paralysis the cause is bilateral syphilitic lesions of the internal capsules.

INCREASE OF HYPEROPIC ASTIGMATISM.

By EDWARD JACKSON, M.D.,

PROFESSOR OF DISEASES OF THE EYE IN THE PHILADELPHIA POLYCLINIC.

THERE is little reason to doubt that, as is commonly believed, in the great majority of eyes the amount of astigmatism remains the same throughout life. That in progressive myopia, changes in the shape of the eyeball should to some extent involve the cornea, and so cause changes in the amount or direction of the astigmatism, was rather to be expected, and the expectation has been justified by reported cases. At one of the early meetings of the American Ophthalmological Society Dr. O. D. Pomeroy described the case of an artist who seemed to have acquired a myopic astigmatism from straining his eyes at portrait-painting.

Increase of hyperopic astigmatism is, however, a different matter. Here we are not led to expect the changes in the shape of the globe that attend the increase of myopia; although cases reported by Risley and Norris show that diminishing hyperopia may be essentially the same morbid process as increasing myopia.

In 1885 Dr. S. Theobald reported to the Ophthalmological Society three cases of astigmatism markedly increased after intervals of some years, of which one was hyperopic. And although the latter case was that of a young man whose eyes had not been submitted to the influence of a mydriatic at each examination, it is probably a case of the kind now under consideration. Two years ago Dr. J. B. Emerson reported to the Society a very striking case of this kind; and at the recent meeting of the American Medical Association Dr. O. B. Frothingham reported a similar case.

My attention was drawn to the subject by the increase of three-fourths of a dioptré in my own compound hyperopic astigmatism. I have since noted seventeen cases which are elsewhere detailed, being all the cases that I have met with in private practice in which the change of astigmatism in either eye

¹ The substance of a paper read before the American Ophthalmological Society, July 17, 1890.

amounted to 0.5 D. or over, the refraction having in each instance been carefully and repeatedly measured under full mydriasis.

In all of these cases the balance and strength of the ocular muscles were carefully and repeatedly tested. In several of them no tendency toward deviation of the visual axes was discovered; in most of the others apparent tendencies of this kind disappeared under the constant wearing of correcting lenses for the anomaly of refraction. In only one was there a marked, persistent tendency of this kind—esophoria. My observations, therefore, do not indicate any special relation between defects of the extra-ocular muscles and increase of astigmatism.

It would be very interesting to know something of the frequency of these cases relatively to the whole population, but my series of seventeen cases throws no positive light on the subject. One cannot estimate what proportion of his patients would return to him should there be a recurrence of their asthenopia, or other symptoms, after the lapse of four and a half years, the average interval in these cases. I have on my records a large number of cases that came to me from competent colleagues with glasses that did not correct the hyperopic astigmatism that their eyes presented. And, doubtless, my colleagues have on their books cases coming from me in a similar condition. Then there are, probably, many in whom the change of 0.5 D. in the astigmatism of one or even of both eyes has not led to a recurrence of asthenopia or other annoyance, for there are many in the community who do not have trouble from that amount of original error of refraction.

Should I hazard a guess at the frequency of these cases of progressive hyperopic astigmatism, it would be that they constitute about two per cent. of all cases seeking relief on account of anomalies of refraction. The cases in which, after the lapse of an equal length of time, the use of a mydriatic has shown me no change in the amount of astigmatism, outnumber them very decidedly; and cases of mixed and myopic astigmatism are relatively, not absolutely, more frequently progressive.

It is of interest to note that no case of regressive astigmatism was encountered, none in which the astigmatism diminished so much as half a dioptr. But it is not improbable that such cases do occur.

It seems probable that progression of astigmatism is determined in some cases by the chronic congestive and inflammatory conditions allied to those of progressive myopia; but acting rather on the anterior segment of the eyeball, and determining a change in the shape of the cornea. But, while the change in the shape of the cornea may thus be caused by distention, the normal gradual increase of hyperopia, which Priestley Smith has shown to be due to the gradual increase in the size of the crys-

talline lens, would cause the change in refraction to be, chiefly, in the direction of increased hyperopia in all meridians, as was observed in most of my cases.

In many of the cases there is a clear history of renewed symptoms of congestion or chronic inflammation, coincident with the change in the amount of astigmatism, quite similar to those which occur in progressive myopia; and in six of the cases there was actual diminution of the hyperopia in one principal meridian of one or both eyes. The condition of impaired nutrition in the ocular coats might be part of some general impairment of nutrition, though none of the cases is noted as giving a clear history of such general ill-health (a history very frequently obtainable in conical cornea); or it may arise from eye-strain due to unusual exertion of the eyes, of which there was a clear history in several cases, or from uncorrected hyperopia due to the normal increase of the lens.

On the other hand, it is likely that in some of these cases the increase in astigmatism is directly due to an unsymmetrical increase in the bulk of the lens, causing more rapid increase of the hyperopia in some meridians than in others. The binocular symmetry of the increase, in certain cases, points toward an individual developmental tendency; while the blood-relationship between some of the patients seems to indicate a family tendency in others. Thus, two of the patients were brothers, two were sisters, and two were first cousins, and in each pair of relatives the astigmatism was progressive at about the same period of life, and in about the same meridians.

From this series of cases we must conclude that liability to change in the amount of astigmatism is not confined to any particular period of life, though such changes are more frequent in early life. My study of the subject leads me to these conclusions:

1. Astigmatism is by no means constant in degree, though decided changes are exceptional.
2. Changes in its amount, and slight changes in the direction of its principal meridians must be looked for. These changes are not due to muscular defects nor confined to any particular period of life.
3. When a patient comes with lenses prescribed some time previously by a colleague, and which do not now correct the ametropia, we must not jump at the conclusion that these lenses were inappropriate at the time they were ordered.

A CASE OF EXTRA-UTERINE PREGNANCY. WITH SPONTANEOUS RECOVERY.

BY LESLIE DEWEES, M.D.,
OF SHELEVILLE, MO.

ON May 11, 1887, I was called to see Mrs. K., thirty-four years of age. She was tall and slender,

weighing 130 pounds before her illness. She had been married twice, and was a multipara. Her health previous to April 15th was good, though her menses sometimes appeared at intervals of a fortnight. About April 15th, slight pain and soreness were felt in the right ovarian region. The pain at first was only occasional, but soon became constant and severe. The menses, expected at this time, did not appear, and the pain and soreness steadily increased for two weeks before medical aid was sought.

About two weeks after what should have been the menstrual period—the time at which the pain and soreness were first noticed—the patient discovered a small tumor at the seat of pain. The alarm caused by this discovery induced her to send for a physician, who, after examination, concluded that the menstrual flow was obstructed, a condition that he endeavored to relieve by the use of tents, probes, etc. Several efforts were made with this object in view. The physician at this juncture failing in the regularity of his attendance, the writer was called until the former should resume charge of the case.

My first call was made on May 11, 1887, when I found the patient with a pulse of 120, temperature 102° F., and respiration 28. Anorexia, headache, and pain in the back were prominent symptoms. Pain and formication in the right hip and lower extremity were also complained of. Frequent micturition with a burning sensation, and constipation seemed also to cause considerable annoyance.

Palpation revealed the existence of a tumor the size of an orange, situated to the right of and posterior to the uterus. There was cellulitis, which was circumscribed, or at least chiefly to the right of the median line. The constipation was only partly relieved at this time by the use of enemata.

Her physician now returned, and I did not see the case again until May 26th, when I saw her in a consultation with Dr. A., and learned that on the previous day Drs. M. and O. had seen the patient, and decided that nothing could be done for her more than to administer palliatives. At the time of this visit the patient was excited, and had a high temperature, quick, wiry pulse, rapid respiration, and seemed fearful that an operation of some kind was contemplated. She was decidedly emaciated. The tumor seemed almost centrally located, as large as a small cocoanut, but flattened upon and attached to the uterus, so that no line of separation could be felt between the tumor and that organ.

Complete occlusion of the bowel had existed for several days, and this condition was relieved with the greatest difficulty by means of a soft rubber catheter attached by a piece of tubing to the nozzle of a hand-ball syringe. By means of a long, flexible probe the catheter was passed beyond the tumor. Through this apparatus a half-pint each of sweet oil and soapsuds were injected, and within half an hour a large quantity of liquid feces was passed, greatly to the relief of the patient.

The speculum revealed an open os, with the lips everted and patulous. A sanguino-purulent discharge came from the cavity of the womb. Much irritation was present from the former use of tents. The uterus was somewhat enlarged, and the fundus

was displaced forward and toward the left side. The cavity of the uterus was increased in proportion to the size of the organ, and was markedly convex on the side next to the tumor.

An operation appeared out of the question, unless the inflammatory condition should subside and the patient greatly improve. Attention was, therefore, given to the cellulitis and the general condition, with the hope of operating subsequently. However, consent was never obtained for the performance of an operation.

But little change took place from the date of the above-mentioned visit until near the middle of July, except that the patient became weaker, and perhaps the tumor grew a little larger.

The cellulitis, which, up to this time, was diffuse and severe, began to grow less, and the temperature was lower. Profuse sweats, with an occasional chill, occurred during the latter part of July. The bowels were relieved by the use of enemata when necessary. Micturition was frequent. The urine was scanty, and contained some pus. Operation was still declined by the patient. On August 1st, after having taken an enema, and during an effort to evacuate the bowels, there was a sudden gush of about two quarts of pus and liquid feces, which materially reduced the size of the tumor. In the pus were found numerous epiphyses, about the size of tomato-seeds, for which they were mistaken by the patient. I was at once notified of this occurrence, but did not see the patient. None of the larger fetal bones were discharged, except two or three ribs. The tumor refilled, and in about three weeks again discharged through the rectum, but the amount of pus was less, and there were fewer epiphyses.

After this, pus continued to flow from the bowel till about October 1st, when it ceased, and the tumor began to enlarge for the third time, but rather more slowly than before. About December 25th, the tumor showed signs of pointing in the vagina to the right of the cervix, and a few days later it opened spontaneously, discharging a large amount of pus, and several fetal ribs, about 1¼ inches long, an ulna, and portions of other bones.

I saw the patient again, January 1, 1888, when one of the parietal bones was arrested in the vaginal opening of the pus-cavity, and by its sharp edge was producing much pain. Under an anæsthetic I succeeded in removing this bone, with several others. Owing to the patient's condition all the bones within the sac could not be removed at this time. For a month after this, bones continued to be discharged. The patient's general condition now began to improve, and when I saw her again, on April 22d, she was able to sit up for an hour daily. The appetite was good, the action of the bowels free and regular.

Micturition, however, was still frequent, perhaps due to the contractions of the tissues about the bladder. The tumor had now nearly disappeared, though a hard cicatrix could be felt in its former place. The larger bones, which had been carefully saved, were counted at this time, and all but two or three were found, and it is probable that these had been lost.

The opening from the sac into the vagina had closed, and aside from the possible continuance of the frequent micturition, together with a tendency to the opium-habit, recovery seemed probable.

On May 12, 1888, I again saw the patient, who could then walk without fatigue, but could not stand erect, which she said was due to a "drawing" sensation in the lower part of the abdomen. She weighed about as much as before her illness.

March 4, 1889. The patient had been complaining of a cutting, or stinging, sensation near the median line and half way between the umbilicus and symphysis pubis, and which she thought was caused by another bone, but which on careful examination I found was caused by a tense condition of the tissues. This tension was probably due to cicatricial contraction, and was distinct only when the spinal column was straightened, or bent backward. On flexing the thighs upon the abdomen the cicatrix could be felt, and was not sensitive to pressure.

The uterus was displaced upward so far that it could not be felt with the finger, and could be seen only by dilating the vagina with a pair of forceps passed beyond a Cusco's speculum. The vagina was also much narrowed by the upward traction of the cicatricial tissue.

It was, of course, impossible to determine in this case at what part of the tube the ovum lodged, and there was nothing which indicated the time that the rupture occurred. The latter fact might suggest that the pregnancy was abdominal, or extra-tubal, but from the previous active habits of the patient, together with the location of the tumor when first noticed, I deem this quite improbable.

It would be difficult to determine with any degree of accuracy the length of time that the foetus lived, but the history and the size of the bones indicate that it died at about the end of the third month.

Doubtless, this case, like many others, might have been cured by an early abdominal section, but after the development of the inflammation there seemed to be no time at which an operation could be safely undertaken.

THE PRODUCTION OF IMMUNITY WITH THE CHEMICAL SUBSTANCES FORMED DURING THE GROWTH OF THE BACILLUS OF HOG-CHOLERA.

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As a continuation of the preliminary paper on the ptomaines from the hog-cholera germ, presented by us to the Chemical Section of the American Association for the Advancement of Science, in August, and published in *THE MEDICAL NEWS*, September 6, 1890, we present now a somewhat detailed account of the successful experiments in the production of immunity in guinea-pigs which have been

made up to date. The work from this standpoint again is of course a practical continuation of the experiments of Drs. Salmon and Smith, made upon pigeons in 1887, in which sterilized culture-media were used for preventive inoculation. We refer further to the bulletin of the Bureau on "Hog-cholera," published in 1889, in which are recorded a number of experiments upon hogs, sterilized culture-media being used for the purpose of producing immunity.

This work of Drs. Salmon and Smith was the pioneer work in preventive inoculation with other than some form of the germ of the disease itself, and the work now recorded was of course under the advice and direction of Dr. Salmon as head of the Bureau of Animal Industry. Without the careful bacteriological study of hog-cholera which has been made by the Bureau of Animal Industry, our work would have been impossible. For our laboratory experiments guinea-pigs were used, as being convenient to handle and susceptible to hog-cholera. They have proved very satisfactory. The material used for inoculation was prepared in the chemical laboratory by modifications of methods already described, and by other methods which will be explained in more detail at some future date. The testing of the materials used, to determine that they were free from germs, and the greater part of the preventive inoculations, were made by Dr. Moore, with such quantities of substance and at such times as we thought best. The autopsies were also made by Dr. Moore, and the work thereby greatly facilitated.

As to the name which should be given to the ptomaines and albumins from the hog-cholera culture-liquids, until their chemical constitution is more thoroughly studied, it would seem best, as there are several distinct swine-diseases, to call the ptomaines from the hog-cholera germs, as a class, *Sucholotoxins*, and the ptomaine which appears to be the principal factor *Sucholotoxin* (from the Greek *σῦς*, a hog, *χολέρα*, cholera, from *χολή*, bile, and *toxus*, poison). *Sucholo-albumin* would seem to be sufficiently distinctive for the albumin of these culture-liquids. As Hankin¹ shows, the name *toxalbumin* is hardly the correct one to apply to these substances. We shall, therefore, refer to the ptomaines and albumin by the names given above.

The first of our experiments that we will record were made with sucholotoxin.

EXPERIMENTS I.—Two guinea-pigs, each weighing about three-fourths of a pound, were treated with a solution of about 0.05 gramme of sucholotoxin each. The solution was introduced under the skin of the inner side of the left thigh. Immediately after the operation the animal appeared uncomfort-

¹ British Medical Journal, 1889, p. 810.

able, but was not made ill. For a few days there was a rise in temperature and also a slight swelling at the point of inoculation, which, however, disappeared in about five days, and the animal was then well.

Two more guinea-pigs were now selected as checks, approximately of the same size and weight as those which had been treated, and the four animals were then inoculated with 0.1 c.c. of hog-cholera virus each (0.1 c.c. beef-infusion and peptone culture one day old, plus 0.2 of sterile, normal salt solution). This is the dose which previous experiments made in the Bureau had shown to be the proper quantity to kill a guinea-pig in from eight to ten days. The inoculations with the virus were also made subcutaneously in the thigh. The checks died in eight and nine days. Post-mortem examination showed a large swelling at the point of inoculation, infiltration of a purulent, grayish substance into the connective tissue, and necrosis of the superficial layer of the muscles of the thigh. Enlargement and reddening of inguinal glands. Peyer's patches enlarged and pigmented; liver pale and covered with a number of necrotic foci; spleen very much enlarged, dark-colored, and friable. Cover-glass preparations from the spleen and liver showed hog-cholera germs. This was the characteristic appearance of all the check guinea-pigs upon post-mortem examination, and it will not be necessary to repeat these details.

Of the animals which had been first treated with the substance mentioned, and afterward inoculated, one died two days after the last check. Autopsy revealed the following: At the point of inoculation in the left thigh the subcutaneous tissue was infiltrated with a grayish-white substance, and the superficial layer of muscles over the inner side of thigh, and 4 square centimetres of the abdominal wall were necrosed. Liver pale. Spleen much enlarged, dark-colored, and friable. Cover-glass preparations from the spleen showed a large number of hog-cholera germs. Both ventricular walls of the heart were light-grayish and very brittle (necrosed). The other guinea-pig of this set was quite ill for ten days, with a large swelling at the point of inoculation. This finally opened and healed and the animal was quite well within three weeks after the inoculation, and has continued so to date—five months.

EXPERIMENTS II.—The next series of experiments were made with sucholo-albumin from beef-infusion and peptone culture-media.

Two guinea-pigs were again selected and treated with about 0.008 gramme each of sucholo-albumin. There was a slight rise of temperature in the animals and the formation of a small, hard lump at the point of injection. This disappeared by the eighth day, and the animals were quite well. Two more guinea-pigs were now taken as checks, and all four animals

were inoculated with 0.10 c.c. of hog-cholera culture. The checks died within seven days. The post-mortem appearances were practically the same as those noted in the first series. The two guinea-pigs which had been treated with the sucholo-albumin died ten days after the checks. This indicates considerable resistance to the disease. Autopsy showed, at the point of injection with the albumin, the subcutaneous tissue thick and reddened. The animals were considerably emaciated. At the point of inoculation a cyst the size of a walnut, and composed of a grayish, purulent substance, was also found. The muscular wall surrounding this was sprinkled with punctiform hæmorrhages. Peyer's patches swollen and pigmented; mucous membrane of small intestine covered with a dry, yellowish, firm layer of mucus; stomach contained a considerable quantity of liquid; liver pale, and showed fatty degeneration; spleen slightly enlarged and dark. Cover-glass preparations showed no germs, but a culture made from the spleen showed hog-cholera germs. Beneath the peritoneum in the region of the spinal column, and in the mesentery was a considerable number of small grayish tubercles. Several other experiments were made by treating guinea-pigs with the albumin in varying quantities, all showing resistance, and subsequently immunity.

EXPERIMENTS III.—Three guinea-pigs were treated with sucholo-albumin, 0.1 gramme being given to each, subcutaneously in the thigh. The albumin for two of the animals was derived from cultures containing blood-serum, the albumose given to the third was from ordinary beef-infusion peptone culture. Ugly ulcers formed at the point of inoculation, which healed, however, in from ten to fourteen days, and the animals with the exception of a slight rise of temperature were well.

Two checks were again selected and the five animals were inoculated with 0.1 c.c. hog-cholera virus. The checks died respectively in eight and ten days from hog-cholera. The animals which had received the preventive treatment were slightly ill for a few days with swelling at the point of inoculation, which finally opened and then healed nicely, and within a week the guinea-pigs were well.

Three weeks after the inoculation, one of these animals was chloroformed and examined post mortem. Not the slightest scar could be discovered, all the organs appeared perfectly normal, and no germs were found.

EXPERIMENTS IV.—Four guinea-pigs were treated, two with a mixture of sucholotoxins, two with sucholotoxin and albumin. The injections were made as before, subcutaneously in the thighs, and at intervals extending over a period of four weeks. The sore caused by each injection was allowed to heal before the next one was made. After the animals

had recovered from the last treatment two checks were selected, and the six were each inoculated with $\frac{1}{10}$ c.c. hog-cholera virus. The checks died, one in eight and the other in ten days, the post-mortem examination showing characteristic hog-cholera lesions. The animals having the preventive treatment were ill for about four days, those that received only the sucholotoxins being more dull than the others. There was also slight swelling at the point of inoculation with the germ, which subsided in ten days, after which the animals were perfectly well, and have remained so—four months.

EXPERIMENTS V.—Six guinea-pigs were inoculated for this experiment, two with solution of the sucholotoxin and four with a solution of the mixed sucholotoxins. The sucholotoxin solution produced only slight local lesions, while the mixed toxins caused ulceration at the point of injection which did not heal for two weeks. The treatment in this case again extended over a period of from three to four weeks. The animals having by this time recovered, the test-experiment with hog-cholera virus was tried. Four of the animals mentioned above were taken—two from each set—and also two checks, and the six were inoculated. The checks died in eight and nine days, the autopsies showing the characteristic conditions of death from hog-cholera. Those that had the preventive treatment were ill and dull for from four to six days after the inoculation. At the point of inoculation there was also some swelling and infiltration, very slight, however, compared with the similar swelling on the checks. In the treated animals the swelling sloughed and healed, and within ten days after the inoculation they were perfectly well. To test the resistance of the animals that had been treated by this method, to ordinary exposure the following experiments were conducted.

EXPERIMENTS VI.—Two guinea-pigs that had received the preventive treatment, two blanks—*i. e.*, animals that had received no treatment—and two check animals that were inoculated with hog-cholera virus were placed in one large cage. The checks became ill and died in eight or nine days from hog-cholera. During this time the cage was cleaned only three times, so as to give full and free opportunity for contagion. One week after the checks had died one of the blanks became ill, and died within ten days. The autopsy showed hog-cholera lesions. The second blank became ill a few days after the first blank succumbed, and died within thirty days. The animals which had the preventive treatment are now and have been quite well, though continually exposed for five weeks to every opportunity for contagion.

EXPERIMENTS VII.—These experiments are a step in advance of those already recorded, and although

not quite so conclusive, indicate that the proper methods have been adopted.

A pure chemical compound prepared synthetically in the laboratory, was used for treating the guinea-pigs. Three animals were taken, and this compound was administered to them by the method already used. There was a slight rise in temperature of the animals and swelling and soreness at the point of injection. After this had healed these animals and two checks were inoculated with $\frac{1}{10}$ c.c. of hog-cholera culture. The checks died in eight and nine days. The animals which had been previously treated became ill, two dying five and six days after the checks. The third entirely recovered.

Post-mortem examination of the two that died showed the following: At the point of inoculation the skin had sloughed away over an area of 1 sq. cm. The superficial muscular layer was necrosed over an area of about 3 sq. cm. and to a depth of 1 mm., lymphatics in the fold of the knee much enlarged; Peyer's patches enlarged and pigmented; spleen *very slightly enlarged and not discolored*; kidneys reddened; lungs normal. Cover-glass preparation from the spleen showed a few hog-cholera germs. On both sides of the spinal column were several grayish tubercles, from $\frac{1}{4}$ to 2 mm. in diameter, lying just beneath the peritoneum. This material is being more fully tested, and experiments which promise to be successful are also being made upon hogs. Autopsies made from the animals of Experiments VI., three or four weeks after their recovery, showed that the parts were perfectly normal, not even a scar being left upon the skin, and the immunity produced was therefore *perfect*.

It is important to add that in all the experiments great care was taken that the solutions used were free from germs, cultures always being made. In cases in which the albumin is used this is particularly important. A single precipitation with absolute alcohol does not suffice to destroy the germs, and it is necessary to free the solution from germs by means of a Pasteur filter, or in some other suitable way. Therefore experiments made with material which has not been tested for germs are practically of no value. As to the poisonous character of the ptomaines, a single large dose is sufficient to kill a guinea-pig in from one hour to two days. The autopsy of a case of this kind is as follows: Liver, pale and fatty; subcutaneous tissue over abdomen, necrosed and infiltrated; muscle, soft and friable. Other organs apparently normal.

The experiments here recorded show:

1. That in guinea-pigs *complete immunity* from hog-cholera can be produced by *chemical inoculation*.
2. The sucholotoxins and sucholo-albumin are equally effective in this respect, and a mixture of

these two products gives greater immunity than either used by itself. The effect of the albumin in producing immunity from anthrax has already been pointed out by Hankin, his experiments being very successful.

3. The sucholotoxins given in large doses produce death. To produce immunity it is necessary that they should be administered in small quantities at a time and at frequent intervals, the system being in this way accustomed to the poison and enabled to resist it.

Further study in this interesting line of work is in progress.

The tabulated results of the foregoing experiments are appended:

TABULATED RESULTS OF EXPERIMENTS IN PRODUCING IMMUNITY FROM HOG-CHOLERA IN GUINEA-PIGS.

| Number of experiment. | Material used for treatment. | Hog-cholera virus used for each animal | Number of animals used. | Number of checks. | Number of days between inoculation with virus and death of checks. | Result in treated animals. |
|-----------------------|-----------------------------------|--|-------------------------|----------------------|--|--|
| I. | Sucholotoxin . . . | 0.10 c. c. | 2 | 2 | 8 and 9 | 1 died in 11 days; 1 recovered. |
| II. | Sucholo albumin . . . | do. | 2 | 2 | 7 | Died in 17 days; great resistance. |
| III. | Sucholo-albumin . . . | do. | 3 | 2 | 8 and 10 | Recovered; immunity. |
| IV. | 1. Sucholotoxins . . . | do. | 2 | | | Recovered; immunity. |
| | 2. Sucholotoxin and albumin . . . | do. | 2 | 2 | 8 and 10 | |
| V. | 1. Sucholotoxin . . . | do. | 2 | | | |
| | 2. Sucholotoxins . . . | do. | 2 | 2 | 8 and 9 | Recovered; immunity. |
| VI. | Sucholotoxins . . . | do. | 2 | 2 blanks 2 checks | 8 and 9 8 and 9 | Blanks died in 18 and 30 days. Others not affected; immunity. |
| VII. | Pure chemical . . . | do. | 3 | 2 | 8 and 9 | Two died in 13 and 14 days. Third recovered; immunity. |

TWO CASES OF FRACTURED SKULL.

Recovery in One; Death from Chloroform in the Other.

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ALTHOUGH traumatic lesions of the cranial shell, in large cities, are of frequent occurrence, those of the kind here described are rarely seen. Both cases are singularly interesting in causation, age of the patients, location and similarity of the lesions, clinical history, pathological conditions, and in the state of the nerve-centres when the patients came under observation.

Now, that cerebral localization is being investigated with great care and minuteness, it is interesting to note how far experiments on the lower animals can be utilized for clinical purposes in man. And further, since the two Hyderabad Commissions have given their, rather conflicting, but, nevertheless, very full and exhaustive, reports on the lethal action of chloroform, it is timely to note precisely the phenomena which attend the mortal action of this drug on man.

The two boys who are the subject of this history were injured on the afternoon of June 11, 1890.

They, with eight or ten companions, found a truck, used for moving stone, standing by the roadside. They got hold of it, some pulling and others pushing, and dragged it up a steep hill. Reaching the summit, they turned it around, got aboard, and let it go down. What the ultimate fate of all the adventurers was after they started on their journey down the hill we are unable to record, but a police officer, hearing the noise of the truck and the screams of the children, hurried into the field, to find the truck capsized near the foot of the hill, and two boys lying about midway down the declivity, both being unconscious, and one apparently dead. The Harlem Hospital ambulance was sent for, and, on its arrival, Dr. F. P. Hammond, the ambulance-surgeon, found W. P., the older boy, apparently moribund. He breathed only in gasps, at long

intervals; the pulse was absent in one wrist, and in the other only a feeble flicker could be detected. Respiration was stertorous; blood mingled with saliva was oozing from the mouth and nose, and there was a bloody fluid flowing from the left ear. Dr. Hammond vigorously stimulated the patient by hypodermic injections, sponged out the mouth, and douched the face with cold water. The little fellow gradually reacted, and in half an hour was in the ambulance.

The other boy, B. J., lay on his back, bleeding freely from a wound of the head, and was also insensible. His general condition was not bad, and before he reached the hospital he regained consciousness.

In each case antiseptic dressings were immediately applied with as much care as possible.

I saw the cases three hours after they were admitted to the hospital. They were then perfectly conscious, but could not give a clear account of the accident. The older boy was still suffering from shock. His pulse was slow, 60 beats to the minute, and the pupils were markedly contracted. The outline of the features was regular, and the nose, ears, and lips of an ashy pallor. The extremities were cool, with marked, though not total, abolition of the reflexes. There were areas on the inner side of the thighs in which sensation was wholly lost, and

others on the palmar surface of the hands where, though sensation was intact, mobility was lost. When asked to move a limb he did so slightly, but with great effort, and on one side only. He was somewhat deaf. Immediately behind the right ear there was a scalp-wound exposing the bone. There was free hæmorrhage from the nose, mouth, and left ear, and from the latter the blood was somewhat serous and straw-colored in character.

His condition indicated fracture of the base of the skull, probably with free hæmorrhage into one of the great cavities of the body.

He was brought into the operating-room, and, as a preliminary to the examination of the wound, we adopted the recommendation of Dr. F. S. Dennis, and shaved the entire scalp, in order that antiseptics might be more rigorously carried out. At the seat of injury we found a fracture which was almost circular, with its greatest diameter from before backward. The large disk of bone was driven into the brain, being wholly detached at its circumference. The position of the fracture was on a line with, and immediately behind, the concha of the ear. The skull surrounding the fracture was fissured in a radiating manner, the fissures extending backward and toward the base being the deepest and most widely separated. Considering the cranio-cerebral topography of the lesion, it was evident that the left lateral sinus was nearly in the centre of this depressed plate of bone, which was evidently a part of both the parietal and occipital bones.

The safest course to pursue was now a question which did not permit much deliberation. Whether, bearing in mind the close proximity of the large venous channel, it might not be safer to cleanse the parts thoroughly, and let the fracture alone—as, independent of the eyes, we had no distinctive indication of cerebral pressure—or whether it would not be better to trephine at once, were the questions which had to be decided. We all know that hæmorrhage from vessels within the skull is sometimes difficult or absolutely impossible to check. We know, too, that an aseptic blood-clot—if not large or within the brain—often undergoes disintegration, organization, or absorption, without causing serious harm. We know further—though, unfortunately, operators are loath to report such cases—that an operation to remove depressed bone, or large blood-clots, may in itself be fatal. I have had, in about one hundred and fifty fractured skulls which I have treated, two such cases.

In one we were removing a large fragment of bone driven into the brain, almost at the confluence of the cranial sinuses. The spicula of bone came out quite readily, but it was followed by a deluge of blood which could not be controlled. In the other case, I trephined above the ear, over the temporo-parietal articulation, for symptoms of compression following an injury. We came at once, upon a very large intradural coagulum. After I had gnawed away, with the rongeur, sufficient bone to remove the clot, I commenced to crush it gently with the fingers, working cautiously until I believed it was nearly displaced, when a jet of dark, tarry blood welled up from the bottom of the space

left by the clot. It came in torrents, and our compresses and hæmostatic forceps were useless. We had re-opened a large trunk which the clot had plugged, and it was fatal. I may add, that I have heard of similar disasters, in the hands of others, but they have not been published.

To return to the present case. I decided to try to elevate, as the fragment was driven in so far that I was able, by chipping off enough bone from the overlapping margin, to get my elevator between the dura and the skull, using the edge as a fulcrum. Happily, I was able to raise quite easily the fragment to its normal position. Very little blood was lost, and the wound, with the entire cranium, the neck, and the eyes, were enveloped in soft antiseptic gauze.

During the night, following the operation, the patient moaned, groaned, cried, and vomited. He had two or three sinking spells and became cold; but Dr. Guest, the house-surgeon, used heat and stimulants energetically, and the boy reacted.

I saw him at 10 A.M., June 17th. At this time it seemed that he could not recover. His pulse was 186, and his temperature subnormal, and he had the heaving respiration which Bell¹ has so well described, as a sure precursor of death. But by noon he commenced to rally and he has made a good recovery; although both pupils are dilated, and he has double convergent squint. Hearing has been perfectly regained and there is no trace of paralysis.

It is interesting to note that in this case we had almost unequivocal evidence of fracture through the base of the skull, and yet the patient made a good recovery, the only organic disturbance at this date being confined to the organs of vision.

Dr. Ferrier in his recent Croonian lectures on "Cerebral Localization," tells us that "the occipito-anterior region is the visual area of the cortex." It seems that this conclusion has been reached, mainly by experiments on monkeys and clinical observations on man. Considering the location of the lesion, in the case just described, and the marked disturbance of the visual organs, at the time of the injury and since, I think that the patient's condition is strong evidence in favor of the correctness and accuracy of the statement made by Dr. Ferrier.

There can be no doubt that considerable blood escaped into, and through the cerebral substance, and that, following the line of fracture, it ultimately lodged in close contact with the base of the pons Varolii and the corpus pyramidale, where, by pressure, it interfered with the nutrition and functions of the ocular nerves, notably and persistently with the abducens.

With the ultimate reduction and absorption of the effused blood, I expect perfect restoration of accommodation.

¹ Sir Charles Bell: *Nervous System*, second edition, p. 203.

The younger of the two boys, B. J., when I saw him, had a large hæmatoma directly behind the right ear, in precisely the same situation as the wound in the preceding case, except that the tumor extended slightly downward into the cellular tissue of the neck. The house-surgeon had made a diagnosis of fracture of the skull. The patient had almost no constitutional disturbance, but there had been nasal hæmorrhage. He did not complain of pain, and moved about in bed without difficulty. He was slightly pale, however, and vomited twice after entering the hospital.

The contour of the hæmatoma, with its firm, bevelled border and depressed centre—characters common to all cranial hæmatomata—and the total absence of any cerebral symptoms, led me to believe that there was no fracture.

The scalp over the swelling was shaved and cleansed, after which I made an incision into the tumor and evacuated it, when I found well-marked linear fractures; one running antero-posteriorly, intersected by another passing toward the base. The greatest extent of fracture was in the occipital bone, extending but two or three lines into the parietal. There was very slight depression of the upper boundary, of the divided plate. Under strict antisepsis, I closed the incision with a continuous suture, and applied the usual dressing.

The following morning the patient was in excellent condition, and speedy recovery seemed probable. At noon of this day he vomited. At 2 P.M. the temperature was 102° . Internal squint of the left eye, varying in degree, was noticed, and the pupil was slightly dilated. He was able to urinate and had no paralysis of the extremities.

On June 17th it was noted that he had passed a restless night. At 8 A.M., temperature was $103\frac{1}{2}^{\circ}$, and at 10.40 A.M. was the same; at 12.30 P.M. temperature was $103\frac{2}{3}^{\circ}$. At 1.20 A.M., June 19th, temperature was $103\frac{3}{8}^{\circ}$; at 2 P.M. temperature was $104\frac{1}{8}^{\circ}$.

I saw him at 3 P.M. on this date. He now had well-marked symptoms of compression with meningitis. His pulse was very rapid, the temperature high, and he was incessantly moving about in the bed. Marked congestion of the conjunctival vessels clearly indicated cerebral hyperæmia.

His mental condition at this stage presented many features of interest. He would have intervals of repose, in which he would lie on his back, with his eyeballs immovably set and the lids widely opened, muttering incoherently to himself. Every few minutes he would arouse from this condition for a short time. When asked how he felt, he would look up, answer intelligently and complain of great pain throughout his head. Then he would immediately lapse into a semi-conscious condition with his eyes open.

It was only too apparent that serious mischief had resulted from the injury, but whether from local conditions, as the pressure of a shattered internal table, or of a clot, was difficult to determine. It was too early for pus to have formed.

I had recently seen two cases of traumatic meningitis in boys: one from fracture of the skull, the

other from an infected scalp-wound. In both there were well-defined cortical lesions, with all the typical symptoms. On trephining these cases, however, nothing was found but a general meningitis, a diagnosis confirmed by autopsy.

In the present case, it seemed to me that there were no symptoms which could be relied upon as an indication to operate. Besides, in refraining from operating I followed the opinion of the veteran French surgeon Verneuil, who says: "Qu'on fasse dans le laboratoire toutes les expériences, qu'on vondra; mais qu'on se garde les transportes au lit du malade."¹ This entirely harmonizes with my own experience.

I was anxious to ascertain the condition of the wound, and, if I found indications of incipient otitis, to trephine, as recommended by Bryant.² My intention was to remove one or two sutures, inspect the line of incision, and reclose the wound without using an anæsthetic. But I found the tissues behind the ear puffed, cedematous, and discolored. On freeing two or three of the sutures I saw that the whole wound was in a bad condition. The edges were covered with a dirty grayish exudate, and were slightly everted, and the whole had an appearance indicative of disease beneath the bone.

As I saw that our operative procedures would be somewhat tedious, and as the patient was keenly sensitive to pain, and, excepting his temperature, in a good general condition, I decided to give him a few whiffs of chloroform, presuming that this would be taken with less resistance and more rapidly than ether, and that it would not congest the vessels of the brain.

Dr. F. P. Hammond, third assistant-surgeon of the hospital, an extremely cautious and painstaking man, administered the chloroform by sprinkling a few drops on lint placed in a tumbler. I had denuded the skull, and removed a piece of bone with a small trephine and rongeur, when I noticed, in an instant, several terrible changes. The patient ceased to breathe; his features were black and bloated; he foamed at the mouth; the eyes bulged, and plainly he was asphyxiated. Feeling for the radial pulse, I was amazed to find it full, slow, and regular—about 60 to the minute. We had before us a genuine case of chloroform-poisoning, with all the symptoms which have been described by other authors and investigators.

The respiratory centres yielded first. This was clear and unmistakable. All our resources were immediately applied, namely, artificial respiration, inversion, inhalation of nitrite of amyl, hypodermic injection of atropine, drawing the tongue forward, douching of the face, and friction of the body. After an interval of what seemed five, though in reality not more than two, minutes, the patient gasped several times. A little later he breathed again, but very irregularly, and would cease unless artificial respiration were continued. Respiration seemed quite fairly reëstablished at one time. It was interesting

¹ Mercredi Médical, May 27, 1890.

² Surgery, third edition.

to note the condition of the brain in the meantime. With dyspnoea and apnoea the brain-tissue crowded into the gap made by the rongeur. The vessels were enormously distended, and of a deep black color. With partial return of respiration the brain gradually receded, and the vessels collapsed to their usual calibre and assumed their normal tint. I had noticed, however, before the symptoms of asphyxia developed, that the cerebral vessels were greatly distended.

No more chloroform was given after the first lethal symptoms were manifest.

Although respiration was partially restored, the deep cyanosis remained, the breathing continued stertorous, and frothy mucus, tinged with blood, oozed from the mouth. In about five minutes, or possibly a little longer, there was another break in the rhythm of the breathing. This time all our efforts were futile. As in the first instance, the pulse continued to beat fully two minutes after the patient was apparently dead, or rather had ceased to breathe.

Although I have witnessed the administration of ether and chloroform a great many times, this is the first case in which I have seen death immediately and directly attributable to the anæsthetic.

This case so clearly and absolutely proves that the lethal action of chloroform begins by benumbing the respiratory centres, that no one can question it. The condition is a veritable asphyxia. The phenomena, to the eye, are precisely the same as those seen in cases of spasm or stenosis of the larynx; in persons who have been submerged in water, and in those struggling through an epileptic fit, when the laryngeal muscles are temporarily convulsed.

It was in the *initial* stages of anæsthesia that the respirations ceased, and after very little chloroform had been given. The vaso-motor nerves and the cardiac centres were affected *consecutively*. The blood, surcharged with carbonic acid, soon destroyed the vitality and irritability of the pneumogastric and sympathetic nerves.

Clearly perceiving, then, how the action of the drug manifests itself, we are in a position to deal with it intelligently. We should act with two objects in view: first, to unload the vascular system, and the brain; and, second, to keep up respiration. It may be said that when breathing ceases the respiratory centres are paralyzed, and all efforts at resuscitation are useless.

But we see many cases which prove that this is not always true. A case of tracheotomy, for instance, reported by me in the *New England Medical Monthly*, January, 1890, is an illustration. In this case, after the trachea was opened, the patient inspired blood. He ceased to breathe, but the pulse continued to beat for some time. With the body limp and apparently lifeless, we worked fully five minutes with artificial respiration, when the patient gasped, and shortly revived, ultimately making a good recovery.

A surgeon related to me, how in a case of croup, he called in a consultant, who advised tracheotomy. Some blood was drawn into the windpipe, the infant had a terrible convulsion, and turned over apparently dead. The consultant, quite shocked at the result, and fearing the maledictions of the parents, immediately left. But the attending physician remained at his post, wiped out the bleeding opening, and with his own lips blew into the child's trachea. In a few moments—fully ten, he thinks—the child commenced to breathe, and finally made a good recovery.

In the case reported above, had we worked more diligently at renewing the air in the lungs, and given less attention to the incision, the result might have been different. But we were too confident; besides, I had to search for and ligate a small meningeal vessel which commenced to spurt freely. When respiratory paralysis occurred for the second time, had we done a tracheotomy and used the invaluable apparatus of Dr. Joseph Fell, of Buffalo, for forced respiration, I am confident our patient might have been saved.

The unfortunate termination of this case has more strongly than ever convinced me of the imperative need of an experienced and trained anesthetizer—one who will give his whole attention to administering anæsthetics; a man of good judgment and who is solely concerned with the patient's general condition. He should be specially licensed, and the administration of an anæsthetic, other than in an emergency, by anyone not professionally and legally qualified should be regarded as a misdemeanor. The present custom is dangerous, and little short of being positively criminal. Usually the anæsthetic is committed to the junior assistant, who is almost wholly ignorant of practical work. He is often more interested in the operation than in giving the anæsthetic, so that when he finally looks into his patient's face, and feels the pulse, perchance the patient is dead. Let us hope that a reform in this matter will soon be accomplished.

The physical characteristics of the two fractures demand only brief mention. From a medico-legal point of view, they are full of interest, and also to those who may be called on, in a court of justice, to testify as to the quality and direction of force brought to bear in traumatic lesions of the skull.

It will be noted that the children were found alone and unconscious, in an open field. No one has been found who saw the accident, or at least who will admit that he saw it.

In each case, so similar were the osseous lesions in extent and direction, that it would certainly seem that they were inflicted with precision and deliberation. The violence must have been great and concentrated. Its point of impact was very lim-

ited, and chiefly in the direction of the base. There were no rocks in the place where the boys were injured. It is hard to conceive how these boys, of light weight, precipitated from a stone-truck, about two feet from the ground, to soft, elastic turf, could receive such injuries. Did the wheels pass over their necks or heads? There were no abrasions or contusions except those immediately over the wounds, and if the wheel had passed over their heads the wounds would have been larger.

Had not the boys regained consciousness, or had they been found dead, so that no history could have been obtained from themselves, the state of the integument, the shape, direction, and extent of the fractures would have thrown no light on the injury.

These cases would seem to prove that there are serious bone-lesions in which we are absolutely unable, from the condition of the parts, to say what was the nature of the force, or in what direction it was applied; hence the importance of the surgeon proceeding with great caution when giving testimony, on which great consequences or even a human life may depend, when such testimony is merely presumption or hypothetical premises.

REPORT OF A CASE OF SPONTANEOUS RE- CESSION OF A LARYNGEAL PAPILLOMA AFTER TRACHEOTOMY.

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MR. LENNOX BROWNE, in his work on *Diseases of the Throat*, under the heading of "Treatment of Benign Growths of the Larynx," warns against harsh methods in attempting their removal. He says:

"The number of persons to whom the advice to wait and watch is given, must be very small, but, without doubt, there is a very large proportion of cases which never require treatment, and, if left to themselves, never assume a serious aspect. There is no reason to doubt that while many of these formations remain thus stagnant a large proportion would, on no less authority than that of Virchow, if untreated, frequently disappear spontaneously, being subject, as they are, to slow atrophy and resorption."

Dr. G. Hunter Mackenzie,¹ of Edinburgh, has reported a case of spontaneous disappearance of laryngeal growths after tracheotomy.

"The case was that of a boy aged five years, who, in 1883, underwent tracheotomy for laryngeal stenosis from warty growths. The growths disappeared after the canula had been worn for a year. The canula was then removed and complete recovery ensued, and without the development of sequelæ."

I wish to add the following:

In the latter part of April, 1885, I was called in

consultation by Dr. John G. Brooks, of Paducah, to see Minnie B. I found a delicate, pale, little girl, six years of age, laboring for breath, inspiration being somewhat more difficult than expiration. I at once made a laryngoscopic examination. The child was making the fullest exertion in its power to inhale sufficient air to support life, and was naturally averse to any additional interference with respiration, so that it was impossible for me to get a good view of the larynx. But I was able to recognize an obstruction in the upper portion of the larynx. The nature of the obstruction I did not then attempt to determine, though I believed that it was a neoplasm. The history of the case was, briefly, that difficult breathing had been first noticed four years previously to this time—that is, when the child was but two years old—and that the difficulty had slowly increased up to the time of my examination. I advised tracheotomy to relieve the urgent dyspnoea, and as a preliminary step toward removing the obstruction.

On May 5th, a few days after I had first seen the child, I performed laryngo-tracheotomy, which gave instant relief to the obstructed respiration, and in a few moments the pale, bluish face and the blue lips were red with the now well-oxygenized blood. Not a bad symptom followed, and on the eighth day after the operation the child was allowed to return home, about five miles into the country.

As soon as she was sufficiently strong I had her brought to my office for further examination. At this time, with the aid of cocaine, I obtained an excellent view of the larynx. In the lumen of the larynx, above the vocal bands, was a pale-red, mulberry-like growth, about the size of a large filbert, and almost filling the cavity. From its appearance, slow growth, and the age of the patient, we arrived at the conclusion that the neoplasm was a benign papilloma. At this time, and afterward, I made repeated attempts to remove the growth with forceps, but the patient being so young, and much frightened by the instruments, I did not succeed in my attempts. After the ineffectual attempts to remove the growth *per vias naturales*, I suggested thyrotomy, but the parents strongly objected to any further cutting operation, as the patient seemed to be doing so well.

The child grew stronger and suffered but little inconvenience from wearing the tracheotomy tube. I, of course, admonished the parents as to the danger of the child breathing unwarmed air through the tube, and she was well protected from exposure to sudden atmospheric changes.

The condition of the case changed little, if at all, for about two years. At the end of this time, however, the mother believed that the child could talk a little more distinctly, and on examination, I thought I detected some diminution in the size of the growth. From this time on we waited and watched. The growth gradually receded until, in December, 1888, three years and eight months after the tracheotomy, the only remaining sign was a small papilla, about one line in length, projecting from the posterior wall of the larynx. The canula was then finally discarded, and the artificial opening

¹ Lancet, April 6, 1889. Abstracted in the Journal of Laryngology and Rhinology, June, 1890.

was closed. Up to the present writing there is no sign of any return of the growth.

In concluding, I wish to call attention to the term *spontaneous*, as used in this report. Strictly speaking, it can hardly be said that the growth disappeared spontaneously, for if irritation of the mucous membrane is one of the most active causes in the production of papillomata of this structure, then the absence of irritation upon a papillomatous growth—or, in other words, rest, as was secured in this case, by tracheotomy—must have been an active agent in producing its recession.

MEDICAL PROGRESS.

Extra-uterine Pregnancy.—The following case, reported by BOISLIEUX, of Paris, in the *Nouvelles Archives d'Obstétrique et de Gynécologie* of August 25, 1890, was one of extra-uterine pregnancy at the third month, terminating spontaneously with the expulsion of the decidual membranes. The patient had been previously subject to pelvic peritonitis, and had been treated for this disease. Six years before the occurrence of extra-uterine pregnancy she was delivered of a living child after a normal labor. At the end of the third month in the extra-uterine pregnancy a few drops of blood were lost, and ergot was given to control the hæmorrhage, which, however, shortly returned, requiring a second administration of ergot and opium by injection twice a day. Some days later the patient appeared exsanguinous, the pulse was small—120 beats a minute, and there was great pain in the right groin; the uterus was anteverted, and the fundus was bound down and immovable, being incarcerated below the promontory of the sacrum. On palpation a distinct swelling could be found on the right side pressing down into Douglas's pouch.

The diagnosis made was that abortion was imminent, and, as a consequence, the ergot was stopped and the opiates continued; the vagina was also packed with iodoform-gauze. After this the pain in the uterus ceased, but persisted in the right groin. There was no trace of lymphangitis or œdema.

Several days later, after persistent pain for six hours, there was expulsion of the fetus and membranes.

Microscopical examination of the membranes which were expelled showed that they were, beyond all doubt, derived from tubal pregnancy. The swelling in the groin rapidly decreased in size, and the woman ultimately entirely recovered.

Flushing the Bladder without a Catheter.—STAFF-SURGEON ROTTER, of Munich, recommends the following process of flushing the male bladder, which obviates the introduction of a catheter, and makes it impossible to introduce septic matter into the bladder. An irrigator, filled with a quart of some disinfecting, and perhaps slightly astringent, liquid, at a temperature of from about 82.5° to 86° F., having a tube six feet or more in length, with a perforated and somewhat pointed end—which, according to the size of the meatus, is covered with more or less gauze previously saturated

with the disinfecting fluid and greased with antiseptic vaseline—is used. For patients with a very small meatus a thin, gutta-percha drainage-tube a few inches in length is attached to the end of the tube, which is exhausted, and then completely filled with the warm fluid. The patient is told to micturate, if possible, and then to lie on his back, with his legs a little drawn up and his pelvis supported. The end of the tube is then introduced into the urethra to the depth of about an inch, and there held by the physician, who continually presses the glans against the tube. The irrigator is then raised, first three feet high, and then six feet, and in from half a minute to two minutes, or, in patients with a very strong sphincter, in three or three and a half minutes, the liquid begins to flow into the bladder. The amount used is easily determined if the irrigator is made of glass; or, if not, by the vibration that is communicated to the corpora cavernosa. If it is intended to fill the bladder completely, percussion, the appearance of the bladder above the symphysis, and, in many cases, the patient's sudden desire to micturate, will give the necessary information.—*Lancet*, August 30, 1890.

Condurango.—In a paper published in the *Bulletin Général de Thérapeutique*, of August 30, 1890, GUYENOT, after a careful study of this drug, reaches the following conclusions:

1. In the form of a powder it is very efficient in the treatment of painful affections of the stomach, and particularly when they are due to ulceration or irritation of the mucous membrane of this organ.

2. In cases of cancer of the stomach, which have been reported as cured by condurango there has certainly been an error in the diagnosis, the real condition present being in all probability that of gastric ulcer.

3. The active principle of condurango has a curious and interesting action, for it produces a true experimental locomotor ataxia.

Guyenot recommends this drug in the following forms:

In powder it may be given in the dose of from a half to one drachm in capsules, or the tincture may be given in the following manner:

R.—Tincture of condurango . . . 5 drachms
Syrup of bitter orange peel . . . 2 ounces.—M.

Sig. A teaspoonful to a dessertspoonful three times a day; or the bark may be made into an infusion by adding half an ounce to three teacupfuls of water and taking one teacupful morning and night; or, a third method of administration consists in taking a half ounce of powdered bark, and adding thereto fifteen drops of hydrochloric acid, and adding to this five ounces of syrup of bitter orange. Of this last mixture a teaspoonful may be taken every two hours.

Use of Iodides in Infantile Scrofulosis.—Tincture of iodine may be administered to very young infants in the dose of a drop a day diluted with a small quantity of barley-water or milk. BESNIER uses iodoform in minute doses for the same purpose in infants.

Remedy for Dyspnœa.—HUCHARD states that aspidospermine, the active principle of *aspidosperma quebr-*

cho, is a useful remedy in the treatment of dyspnoea. When powdered it may be prescribed in the dose of one-half to one and one-half grains a day, or it may be injected hypodermically provided that the hydrochlorate is employed, the solution being made by adding seven grains of the drug to every two and a half drachms of distilled water.

Snuff for Coryza.—In the *Journal de Médecine de Paris*, ASCHMANN recommends the following powder in coryza:

| | |
|-------------------------------|------------|
| R.—Finely-powdered naphthalin | 6 drachms. |
| “ “ boric acid | 6 “ |
| Powdered camphor . . . | 15 grains. |
| Extract of violets . . . | 15 “ |
| Essence of rose . . . | 10 drops. |

To be used as a snuff in coryza.

The Human Body Forty Years under Water.—A very interesting report has just been issued by DR. KÖNIG, “Gerichtsarzt” (judicial physician) of Hermannstadt, on the state in which the human subject, after forty years’ immersion in water, may be found by the physiologist. In the revolutionary upheaval of 1849, a company of Honvéds, as the Hungarian militia are called, having fallen in the vicissitudes of war, were consigned to the waters of the Echoschacht, a pool of considerable depth not far from Hermannstadt. Their bodies have recently been brought up to the light of day, and subjected to a careful and minute investigation from the physiologist’s point of view. Dr. König found them in perfect preservation, without a single trace of any decomposing process. Externally, they had the appearance of having been kept in spirit. The epidermis was of a whitish-gray color; the muscles rose-red, feeling to the touch like freshly-slaughtered butcher’s meat. The lungs, heart, liver, spleen, kidneys, bladder, stomach, and alimentary canal were of the consistence of those in a newly-deceased corpse; while the brain was hard and of a dirty gray color, as if preserved in spirit. Structurally, the organs retained their outline perfectly, and were so easily recognizable in tissue as well as configuration that, according to Dr. König, they might have been exhibited for “demonstration” in an anatomical lecture-room. After forty-one years under water these are indeed remarkable phenomena. The large intestine contained fæces of a yellowish-brown color, quite unaltered and inodorous; while the bladder was partially filled with straw-colored urine. But perhaps the most significant feature disclosed by these corpses is the following: In their interior a large amount of chloride of sodium, crystallized in cubes, had been deposited and fixed on the several tissues and organs, and this salt had not penetrated, mechanically, into the dead bodies from without. In the completely closed and perfectly unimpaired pericardium, and also on the outer surface of the heart itself, crystals of the same kind were found. This, according to Dr. König, clearly shows that, in the water, particles held in solution may pass through the skin and the muscles, and find their way into the most deeply-seated organs. Herein, he adds, we have confirmatory proof, if such were needed, that the specific virtues of mineral baths exercise in this way their salutary effect on the internal economy of the bather. There is a

notable difference, however, between the time spent in the bath by an ordinary bather at a “Curort” and the forty-one years during which the Honvéds remained under water. The phenomenal quietness of the Echoschacht may also have been a material factor in this impregnation of the corpses with chloride of sodium. But, with every allowance for such considerations, Dr. König has furnished a striking illustration of the permeability of the immersed human subject to salts in solution, and we hope his painstaking researches will lead to others in the same important direction.—*The Lancet*, August 9, 1890.

On the Assimilation of Natural and Artificial Butter and Tallow in Healthy Persons.—In order to throw some light on this matter, DR. NIKOLAI F. FLORIN, of St. Petersburg, has carried out (*St. Petersburg Inaugural Dissertation*, 1890, No. 24, pp. 50) a series of elaborate and most careful comparative experiments on nine men (including himself) aged from 21 to 35 years, and a lady (the author’s wife) aged 27 years. In each case the experiment lasted ten days, being divided into two periods of equal duration. In seven of the ten experiments, during one of the periods, artificial butter (obtained from a local manufactory and prepared after somewhat modified methods of Mége-Mouriès and Mott) and during the other period genuine butter was given. The remaining three persons were similarly taking artificial butter and tallow. Besides the fats, the dietary consisted of cooked meat, fatless beef-tea, thick gruel (*Kasha*), wheat or rye bread, the whites of eggs, tea, sugar and salt. The essential outcome of the researches may be given as follows: First. The assimilation of natural butter oscillates between 94.74 and 97.81 per cent. (of the fat ingested), averaging 95.89; that of an artificial butter, between 92 and 95.25, averaging 94.82; that of tallow, between 92.55 and 93.07, averaging 92.75. Second. Therefore artificial butter is not assimilated by healthy adults as well as a genuine one (the difference amounting to 2 per cent.), but better than tallow (at the rate of 1.91 per cent.). Third. Artificial butter is tolerated by healthy people quite well (if it is prepared of the best materials and under the strictest precautions in regard to cleanliness, etc.). Fourth. Nevertheless there is no necessity whatever for artificial butters—at least so far as Russia is concerned. Hence, the government should prevent the establishing any new butter factories, while exercising the strictest sanitary supervision of those already in existence.—*St. Louis Medical and Surgical Journal*, September, 1890.

Ointment for Pigment Spots of Pregnancy.—The following prescription for the treatment of cloasma of pregnancy is quoted by the *Revue de Thérapeutique*:

| | |
|-------------------------|---------------|
| R.—Zinc oxide . . . | 1 drachm |
| White precipitate . . . | 1½ grains. |
| Castor oil . . . | 2 drachms. |
| Essence of rose . . . | 10 drops. |
| Cocoa butter . . . | 2 drachms.—M, |

Apply morning and evening.

The Relations between Quinine and Malaria.—The close association of malaria and hæmoglobinuria is undoubted, and in a series of attacks of tertian ague the

earlier ones may be simple, and the later complicated with hæmoglobinuria. To the Italian physicians it is an important question whether the large doses of quinine that they are in the habit of giving do not induce hæmoglobinuria. TIRABOSCHI discusses the question and describes cases in which hæmoglobinuria began with the administration of 10 grains of quinine three times a day, and others in which the symptom disappeared under the same circumstances. He can find no cases of malarial disease in which quinine alone, without the factor of paroxysmal fever, produced hæmoglobinuria. Consequently he is inclined to attribute little or no influence to the drug in the causation of the symptom. He can trace no clear analogy between any action of quinine and what he considers the two chief sources of hæmoglobinuria, namely syphilis and cold.—*Practitioner*, September, 1890.

Induction of Premature Labor in Contracted Pelvis.—DR. E. AHLEFELD (*Centralblatt für Gynäkologie*, July 26, 1890) reviews his results of the induction of premature labor in 111 cases of contracted pelvis, and concludes:

1. That the induction of premature labor is a better procedure than Cæsarean section in cases of contracted pelvis, if the conjugate is not less than 7 cm. This is proven by the fact that of the author's 111 cases, only one mother died, and of the 101 children born alive, 61 lived.
2. That Krause's method—the introduction of a flexible bougie—is the best method, and can be performed in a private house as well as in a hospital.
3. The operation should be delayed as long as possible.
4. Under ordinary circumstances induced premature labor should be conducted in the same manner as normal labor.
5. If the life of the mother only is considered the labor should be terminated quickly by rupturing the membranes and evacuating the uterus, but otherwise the membranes should be preserved intact.

Pills for Dysentery.—BOUDIN, in *L'Union Médical*, September 2, 1890, recommends the following pills for the treatment of dysentery:

R.—Ipecacuanha 5 grains.
Calomel 1½ "
Extract of opium 1 grain.

To be made into three pills and one given every hour and used either for dysentery or diarrhœa dependent upon exposure to heat.

Ointment for Tinea Tonsurans.—

R.—Caustic potash 30 grains.
Carbolic acid 15 "
Lanolin and cocoa butter each 1½ ounces.
Essence of lavender a sufficient quantity to perfume the mass.

These materials are to be made into an ointment and well applied at night to the affected part, limiting its application to the diseased tissues or a little beyond them. There is generally an improvement after ten days, but in very marked cases relief may not be obtained for as long a period of three months.

Formula for Scrofulosis.—In *L'Union Médical*, August 26, 1890, the following prescription of GUEPIN for scrofulosis is given:

R.—Iodide of potassium . . . 75 grains.
Chloride of ammonium . . . 30 "
Simple syrup 1½ ounces.
Distilled water 4 "

A teaspoonful of this is to be taken night and morning and may be accompanied by cod-liver oil. The patient, if possible, should stay for as long a time as possible at the seashore.

Syrup for Rheumatism.—The following prescription, recommended by AUDHOURI, is given for rheumatism:

R.—Iodide of potassium . . . 75 grains.
Salicylate of sodium . . . 5 drachms.
Syrup of bitter orange peel . 10 ounces.

Of this syrup two to four dessertspoonfuls are to be given each day to an adult for the purpose of relieving the pain and quieting the patient, or if the patient is a child, a coffeespoonful three times a day will generally be sufficient. It is always best to give at the same time that this mixture is administered a small dose of morphine to relieve any pain which may be present.

Treatment of Gonorrhœal Arthritis.—

R.—Camphor 100 grains.
Extract of opium 75 "
Alcohol 1 drachm.
Extract of belladonna . . 75 grains.

This is to be made into a cataplasm and applied over the part from ten to twelve hours, the joint being made immobile by proper dressings.

Insanity and Bright's Disease.—DR. ALICE BENNETT has made a thorough study of the relations between Bright's disease and insanity, and in an exhaustive paper read before the Pennsylvania State Medical Society draws the following conclusions:

1. That, contrary to the generally received opinion, affections of the kidney are very common among the insane.
2. That "uræmic poisoning" is one of the most frequent causes of insanity.
3. That while the mental manifestations may be as varied as there are different centres subjected to irritation by these unknown poisons, the most prominent and constant symptom is some form of *mental pain*, which may range from simple depression, through all degrees and varieties of delusions of persecution, self-condemnation and apprehension, with or without hallucinations, up to a condition characterized by a frenzy of fear, with extraordinary motor excitement, and rapid physical prostration—the "grave delirium" or "typho-mania" of some authors.

4. That the motor centres are specially liable to be affected, as evidenced by the restlessness and incessant activity of many cases, less frequently by convulsions and convulsive twitchings; occasionally by choreic movements; occasionally by cataleptoid states.

Dr. Bennett cites a large number of cases in support of her deductions.

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THE TREATMENT OF TUBERCULOSIS OF THE LARYNX.

TUBERCULOUS disease of the larynx is so distressing a complication of a most distressing malady that every observation upon its treatment is deserving of attention. While this condition does occur as a primary localization—a fact long disputed, but finally settled by the studies of J. Solis-Cohen, published in 1881—it is most frequently associated with pulmonary tuberculosis. The special therapeutic problem to be solved, then, is not so much how to bring about the absolute recovery of the patient—for this is bound up with the larger question of the treatment of internal tuberculosis in general, and pulmonary tuberculosis in particular—but how we may bring about healing of the local lesions, or how we may mitigate the sufferings to which those lesions give rise.

It has long been held by competent authorities that in a certain small proportion of cases tuberculous ulceration of the larynx will heal under measures of cleanliness and antiseptics, such as washing with detergent sprays and the insufflation of iodoform—proper attention, of course, being given to general measures of nutrition. Of the truth of this view we can recall a most remarkable instance, that of a patient who came under our observation in 1883,

and is still living, apparently well. This man, a commercial traveller, learned how to insufflate iodoform into his own larynx, and for more than a year practised this expedient thrice daily while on his journeys.

It must be admitted, however, that the proportion of such cases is small, and hence, since the discovery of the tubercle bacillus has led to general acquiescence in the theory of the local origin of the morbid processes, renewed efforts have been directed toward discovering feasible methods for radical extirpation of the diseased tissues. Instances from pre-bacillary times were not wanting, in which good results had followed such measures, instituted on the general principles of good surgery. Thus, J. Solis-Cohen, in 1870, excised the epiglottis of a woman with phthisis, on account of limited tuberculous ulceration, and the patient was reported alive and well twelve years later.

The great difficulty in the majority of cases, however, lies in the comparative inaccessibility of the lesions. Tuberculous lymph-glands of the neck, tuberculous joints, and the like, are readily amenable to direct surgical procedures. Manipulations within the larynx are not easy under the most favorable circumstances, and are extremely difficult in the tortured and enfeebled subjects of tuberculous disease. Thyrotomy for better access is not likely to be successful, for the chances are that infection of the wound will prevent healing, and lead to a more rapidly fatal issue. It would be an exceptional, almost unimaginable case, that would justify laryngectomy.

Krause, of Berlin, encouraged by the success of von Mosetig-Moorhof in the use of lactic acid in the treatment of epitheliomata, employed that agent to destroy laryngeal tissues infiltrated with tubercle, and the reports of his good results have encouraged specialists throughout the world to resort to the same procedure.

The larynx being thoroughly cocaineized, ulcerated parts are curetted and harshly rubbed with a sponge or cotton wad, saturated with a solution of lactic acid. The strength of the solution varies from 30 to 40 per cent. at first, to from 50 to 80 per cent. finally, according to the severity of the reaction. Chromic acid, the electric cautery, and superficial electrolysis, according to Voltolini's bipolar method, have also been resorted to.

Krause has likewise vigorously applied lactic acid without preliminary curetting, to reduce the infil-

tration of non-ulcerated structures, and he claims excellent results; a claim which has been confirmed by other good observers.

In a communication to the Berlin Congress upon the curability of laryngeal tuberculosis by surgical treatment, LUC (*Archives de Laryngologie*, August, 1890) reviews the various procedures instituted with this object. Many specialists, he says, have not succeeded in obtaining results as brilliant as those reported by Krause, Hering, and others, from curettage and lactic acid, and have, therefore, despairingly fallen back upon purely palliative measures. To illustrate the possibilities of success in radical treatment of accessible lesions, he reports the case of a man, thirty-five years old, affected with tuberculosis of the naso-pharyngeal mucous membrane, in whom Krause's local treatment, combined with superalimentation and other appropriate general measures produced a perfect cure. He also reports a case of limited laryngeal tuberculosis, in which energetic curetting and lactic acid applications had apparently brought about recovery. The patient, however, returned some two months later, after a sojourn in the country, much improved in general health, but with a new local lesion. This latter case, he believes, emphasizes the importance of continuous local treatment; the combination of proper topical applications, with the most approved measures to promote general nutrition, being absolutely necessary in every case.

From a large number of observations the author concludes that the method of Krause is capable of producing good results in well-selected cases; but he deprecates its indiscriminate employment. On account of the pain and distress to which the patient is put, he considers that it is the part of humanity not to resort to this expedient when the condition of the lungs or other organs is such as to render the case absolutely hopeless, or when the laryngeal lesions are so situated that thorough treatment is not possible. On the whole, this is sound advice; though, in certain cases, even with advanced pulmonary lesions, it may be advisable to perform tracheotomy, and then actively curette, and apply lactic acid to the larynx, in the endeavor to avert the difficulty of nutrition, which arises in late stages from the exquisite pain in swallowing, due to the passage of food over ulcerated surfaces. The truth is, that in no disease is more discretion required of the physician in applying general rules to individual cases.

REVIEWS.

TRANSACTIONS OF THE AMERICAN ORTHOPÆDIC ASSOCIATION. Vol. II. Published by the Association. Philadelphia, 1890.

THE development of the various departments of surgery has been so rapid that it is practically impossible for the general practitioner of medicine to follow the advances in the year's work; and although the papers read before the American Orthopædic Association have, in the main, appeared elsewhere, their collection in one volume is most serviceable, since in an hour's reading the subscriber is able to appreciate the best thought and best methods of the most progressive orthopædists.

As would be expected, hip-joint disease is discussed at length, and it is a satisfaction to perceive that the tendency of the present day is not toward conservative treatment.

Dr. W. R. Townsend contributes a paper upon "Acute Arthritis of Infants," tabulating a long series of cases. In the treatment he has nothing new to offer, beyond meeting the well-known indications of suppurative processes.

Dr. DeForest Willard contributes two papers—one upon "Rest and Fixation in Joint Disease," the other upon "The Operative Treatment of Hip Disease." Both of these are characterized by sound common-sense, always noticeable in the writings of this distinguished surgeon.

It is interesting to note that the general drift of all the papers is toward greater attention to what may be called the minor details of treatment; new splints, new applications of old methods are advanced. There is no indication of any radical change of treatment, of any great advance, but in this volume will be found hints and suggestions of the greatest possible value.

ELECTRICITY IN THE DISEASES OF WOMEN, WITH SPECIAL REFERENCE TO THE APPLICATION OF STRONG CURRENTS. By G. BETTON MASSEY, M.D. Second Edition, revised and enlarged. Philadelphia and London: F. A. Davis, 1890.

THIS little volume and the methods which it advocates have been subject to much adverse criticism—criticisms, for the most part, on the part of those ignorant of the principles here set down; but such of his critics as are severe and unjust Dr. Massey can well silence by pointing to the second edition of his work so quickly following the first. Indeed, the popularity of this work is, to a certain extent, a guarantee of its value, or at least an assurance that it is not without value; and of the sincerity of its author none who reads its pages can doubt. The list of cases and of reported cures would be conclusive, were such reports from one man ever conclusive. It will not be until we have the experience of many observers, and of those not primarily in favor of electricity, that a decision as to the true value of this agent as applied to the diseases of women can be reached.

The first few chapters of this work are rightly devoted to a description and explanation of apparatus. Chapter XI. is upon the subject of the electrical treatment of fibroid tumors of the uterus. The author has certainly made out a strong case for his side of the question.

The electrical treatment of uterine hæmorrhage, of subinvolution, of metritis and endometritis, of inflammatory diseases of the uterine appendages, of pelvic pain, of uterine displacements, of extra-uterine pregnancy, and of miscellaneous conditions, are next considered.

It will be a surprise to those opposed to electricity to learn that Dr. Massey has devoted his twentieth chapter to the "Contra-indications and Limitations to the Use of Strong Currents," for according to their statements, it would seem that, in the mind of the electrician, there are neither contra-indications nor limitations. This, however, is unjust and untrue; and, considering the strength of his belief in his methods, Dr. Massey is singularly fair in his conclusions.

SOCIETY PROCEEDINGS.

AMERICAN ORTHOPÆDIC ASSOCIATION.

*Fourth Annual Meeting, held at Philadelphia,
September 16, 17, and 18, 1890.*

(Continued from p. 320)

SECOND DAY—MORNING SESSION.

This day was devoted to the subject of

ROTARY LATERAL CURVATURE OF THE SPINE.

DR. BENJAMIN LEE, of Philadelphia, read a paper on
THE NERVOUS AND MUSCULAR ELEMENTS IN THE CAUSA-
TION OF IDIOPATHIC CURVATURE,

in which he remarked that the maintenance of equilibrium is the first necessity, and that a very small lumbar curve will necessitate a large dorsal compensating curve. It is not strange that the comparatively trifling lumbar curve often goes unnoticed and that the large dorsal curve is the first to attract the attention of the mother or the dressmaker. In fact, in the large majority of cases, the mother does not detect the former even when it has become aggravated, until the surgeon points it out to her. Under ordinary circumstances it is not conceivable that the use of the muscles which move the upper extremity should draw the spine toward the extremity. The extremity must of necessity be drawn toward the spine. We cannot attribute the dorsal curve to direct traction by those muscles, however excessively they may be developed.

DR. CHARLES L. SCUDDER, of Boston, contributed a paper on

THE MUSCULAR ELEMENT IN THE ETIOLOGY OF ROTARY CURVATURE,

which was a preliminary report of an investigation to establish an index of muscular strength in growing girls for each year from the tenth to the nineteenth year of age. The report was based on an examination of the backs of 1041 of the schoolgirls of Boston. The examinations were conducted by means of a chair especially constructed for the purpose, the strength of the back-muscles as a group being measured by a self-registering dynamometer. The results of the investigation show a gradual increase in the strength of the back-muscles of the growing child. The importance of this investigation, as establishing a firm scientific basis for a further study of the muscular element in the etiology, was

shown, as well as its bearing upon the treatment, the prognosis, and the recording of lateral curvature cases.

DR. R. W. LOVETT, of Boston, contributed a paper on the

ETIOLOGY OF LATERAL CURVATURE,

and DR. A. B. JUDSON, of New York, one upon the

MECHANISM OF ROTATION IN LATERAL CURVATURE.

Dr. Judson said that rotation is a necessary accompaniment of curvature of the spine in disease and also in health. It may be seen in a thin person when the trunk takes a strong curve to the right or left, and is readily observed in a gymnasium. It is one of the normal functions of the spinal column and adds a sinuous grace to the movements of the trunk. Its cause is found in the fact that when the spine curves laterally, the bodies, forming the anterior part of the vertebral structure, are free to move laterally in the cavities of the chest and abdomen, while the processes forming the posterior part of the column are prevented from the same degree of lateral displacement by being entangled in the pareties, composed of ribs, muscles, and fasciæ.

An important effect of rotation in the deformity produced by lateral curvature is that the curve is greater in the anterior part of the column than in the posterior. A slight curve in the process means a considerable curve in the bodies, and an early diagnosis may be made by looking for rotation rather than for curvature. Rotation may be recognized in a case of incipient lateral curvature by detecting scapular obliquity and a prominence of the transverse processes on the side of the convexity. Its effect on the ribs is to produce an inequality in the diagonal diameters of the chest. In the absence of positive knowledge of the etiology he assumed that lateral curvature is an expression of inability (very likely of nervous origin) on the part of the muscles to hold the spine erect.

He disapproves of the use of braces applied for the forcible arrest or reduction of curvature, as he believes that the mechanical difficulties are too great. A knee can be straightened by applying pressure from before backward in the neighborhood of the joint and counter-pressure from behind forward at points remote from the joint on the long bony levers which compose this joint, but he would not try to straighten by pressure an upright column composed of many short bones thrown into a double or triple curvature with the added complication of rotation at two or three points in opposite directions.

He would advise the patient to avoid fatigue from whatever cause, and to assume for as many hours in the twenty-four as is practicable those attitudes in which there is the nearest approach to symmetry. The patient should sleep supine with lordosis produced by an air pillow. The same position should be assumed a portion of every day. Suspension should also be practised up to, but not beyond, the point of fatigue.

AFTERNOON SESSION.

Papers on the *Treatment of Lateral Curvature* were read by Drs. E. H. Bradford, of Boston, and Henry Ling Taylor, of New York.

THIRD DAY—MORNING SESSION.

DR. JOHN RIDLON, of New York, read a paper entitled

A REPORT OF SIXTY-TWO CASES OF HIP-DISEASE
OBSERVED IN THE PRACTICE OF HUGH OWEN
THOMAS.

He presented for consideration further facts regarding the use of the Thomas hip-splint. Conclusions could not be drawn from his study of the cases, but he ventured the following suggestions:

Very many of the cases had had the short splint applied before muscular spasm and pain had subsided and before deformity had been reduced, and they had been allowed to walk about without high patten and crutches. Those whose joints had been only partially immobilized, without being protected from the pressure, superincumbent weight, and the concussion of walking, presented a slight degree of adduction, absence of motion, and in a few cases slight flexion, and in one instance in-knee. On the other hand, those cases that had worn a long splint until cured, that remained in the horizontal position till all pain and muscular spasm had subsided and had then used the high patten and crutches, and had had the benefit of intelligent care and nursing, have been cured without flexion or other deformity than a shortening due to actual erosion of bone and arrested growth; a very large proportion have shown motion, and in not a few has there been normal motion.

The average duration of limp before treatment was commenced was, in the 62 cases, a little over ten months. Average duration of treatment was not computed, as only a few cases were cured, and many had been under treatment but a short time. Of the 58 cases that had been under treatment for a longer or shorter time, 24 had shortening, 24 had adduction, 5 had abduction, 3 inward rotation, and 2 had outward rotation. In the cases where abduction coëxisted with the shortening, it was an advantage, as it compensated in a measure for the shortening.

DR. JAMES K. YOUNG, of Philadelphia, followed with a paper on

DISEASES OF THE EYE ASSOCIATED WITH CARIES
OF THE SPINE.

He said that the diseases of the eye associated with caries of the spine are, from necessity, of the same pathological nature—strumous or tubercular.

Scrofulosis may be considered the constitutional predisposition to caseation; tuberculosis the same condition infected with bacilli of tuberculosis. Both the lesions of the eye and the caries of the vertebræ yield more readily to constitutional and local treatment combined.

Referring to the relation between scrofula and tubercle, Treves has given the following conclusions:

"1. The manifestations of scrofula are commonly associated with the appearance of tubercle; or, if any fully-formed tubercle be met with, a condition of tissue obtains that is recognized as being preliminary to tubercle. Anatomically, therefore, scrofula may be regarded as a tuberculous or tubercle-forming process.

"2. The form of tubercle met with in scrofulous diseases is usually of an elementary and often of an immature character; whereas in diseases called tuberculous in a strict clinical sense, a more perfect form of tubercle is met with in the form of gray granulation or adult tubercle.

"3. Scrofula, therefore, indicates a milder form or stage of tuberculosis, and the two processes are simply separated from each other by degree."

DR. SAMUEL KETCH, of New York, read a paper on

POSTERIOR RACHITIC CURVATURE OF THE SPINE.

He said that of the deformities of the spine whose underlying cause is found in the condition known as rachitis, those most commonly seen in practice are the lateral and posterior.

The etiology and pathology of posterior rachitic curvature of the spine are essentially those of rickets in general, the deformity being simply one of the local manifestations of a general diathesis. Dr. Ketch believes that the causation is largely mechanical, and furthered by such movements as tend to throw the weight of the body on the weakened vertebræ and their appendages. Rachitis of the vertebræ evinces itself, as does rachitis usually, at a very early period of life, by an irregularity in the process of ossification, by cartilaginous enlargements, and by marked diminution of the harder substances entering into the formation of bone, notably the lime-salts. In consequence of this unstable condition of the rachitic vertebræ we find in the long axis of the spinal column many soft places, in some cases including the upper and lower surfaces of all of the vertebræ, in others localized to a few.

A large number of cases show a limitation of the curve to the dorso-lumbar spine, a favorite position for the occurrence of Pott's disease. In addition to the deformity we may have more or less pain, spinal rigidity, pseudo-paralysis, or any of the distinctive symptoms relating to the area of the disease.

In the treatment of young children from one to two years old, he never advises the use of mechanical supports, the tissues being so unstable that any pressure is apt to be badly tolerated. In such cases the constant recumbent position, with fresh air and sun-baths, together with internal treatment and close attention to the diet, is usually sufficient.

AFTERNOON SESSION.

The following papers were read and discussed:

Relief of Paraplegia, by Dr. A. J. Steele, of St. Louis; Lateral Deviation of the Spinal Column in Pott's Disease, Dr. R. W. Lovett, of Boston; Prognosis of Pressure Paralysis, by Dr. T. Halsted Myers, of New York.

DR. A. B. JUDSON exhibited an apparatus by which it was demonstrated that the strain falling on the tendo-Achillis when a person stands on tiptoe on one foot greatly exceeds the weight of the body. The foot was shown to be a lever, its long arm being the distance from the ankle to the toe, and the short arm extending from the ankle to the heel. In the apparatus shown, the four pounds representing the weight of the body appeared as twelve pounds on the spring-balance which represented the tendo-Achillis. To estimate the tension of the tendon, the weight of the body is to be multiplied by the number of times the distance from the ankle to the heel is exceeded by the distance from the ankle to the toe. If the former is one-third of the latter, in a man weighing two hundred pounds, the tension of the tendo-Achillis is six hundred pounds.

OFFICERS FOR 1891:

President.—Dr. A. B. Judson, of New York.

First Vice-President.—Dr. Ap Morgan Vance, Louisville, Ky.

Second Vice-President.—Dr. George W. Ryan, Cincinnati, O.

Secretary.—Dr. John Ridlon, New York.

Place of meeting, Washington, D. C., 1891, in connection with the Congress of American Physicians and Surgeons.

MEDICAL SOCIETY OF VIRGINIA.

Twenty-first Annual Meeting, held at Rockbridge Alum Springs, Virginia, September 2, 3, and 4, 1890.

THE twenty-first annual session of the Medical Society of Virginia convened at Rockbridge Alum Springs, Virginia, Tuesday evening, September 2, 1890, and adjourned Thursday evening, September 4th, to partake of a banquet tendered by the managers of the Springs to the Society and its guests.

The session was called to order by the President, Dr. Oscar Wiley, of Salem, Va. There were also on the stand the Secretary of the Society, Dr. Landon B. Edwards, of Richmond, Va.; the several ex-Presidents of the Society, and the following invited guests: Dr. Landon Carter Gray, of New York City; Drs. Joseph Price and Joseph Hoffman, of Philadelphia; Dr. E. S. Ricketts, of Cincinnati; and Dr. George Herndon, of the U. S. Navy. Among other distinguished visitors at the Springs to whom the same compliment was extended, was General Joseph E. Johnston.

After prayer by the Rev. E. F. Garrison, of Philadelphia, and the cordial address of welcome on the part of the Rockbridge Springs Company, by the resident physician, Dr. J. Edgar Chancellor, of the University of Virginia, Dr. JOHN S. APPERSON, of Marion, Va., delivered the

ANNUAL ADDRESS TO THE PUBLIC AND PROFESSION,

in which he dwelt upon the value to the public of regular medical societies.

Following this address, the committee appointed to examine the essays which had been presented for the Hunter McGuire prize of one hundred dollars for the best original essay on the *Diagnosis, Pathology, and Treatment of Chronic Cystitis in the Male*, after having carefully examined each of the seven papers presented, decided that the essay signed "*Causa cessante, cessat effectus*," possessed the greatest merit. On opening the envelope corresponding to this motto, the author was found to be Dr. R. M. Slaughter, of Theological Seminary, Virginia. This essay will soon be published in full in the *Transactions* of the Society, and in the *Virginia Medical Monthly*, and probably in other journals.

Dr. Hunter McGuire, who was present, after awarding the prize by mail (the author not being at the meeting), authorized the announcement that he would award another prize of one hundred dollars at the next annual session of the Society to the practitioner residing in West Virginia, Virginia, or North Carolina presenting the best original essay on some subject that will soon be announced by the Secretary. All essays offered in com-

petition must become the property of the Society, and will be disposed of by it or its Publication Committee.

During the session about one hundred and fifty physicians were in attendance, the total membership being about eight hundred. Nearly fifty new members joined during the meeting. A large number of non-professional men and women were present during the session of the first night, and throughout the several daily meetings Mrs. Mary Young Ridenbaugh, the granddaughter of Dr. Ephraim McDowell, was present as an interested spectator and listener, and received the compliment of being formally introduced to the Society by the President.

SECOND DAY.

At 11 A.M., the President, DR. OSCAR WILEY, delivered his

ANNUAL ADDRESS,

which was retrospective, suggestive, and prospective, as to the profession of Virginia in particular, and was extremely interesting.

THE TREATMENT OF THE SUMMER DIARRHOEAS OF CHILDREN

was the subject selected for a general discussion which occupied several hours. While the discussion was interesting, and some practical points were brought out, nothing was said that indicated a marked advance in our knowledge of the nature and treatment of these diseases.

The appointed leader in the discussion was Dr. C. T. Lewis, of Clifton Forge, Va., who opened the discussion by reading a paper on the subject. Dr. J. N. Upshur, of Richmond, also read a paper.

Extempore remarks were made by Drs. Thomas J. Moore, J. S. Wellford, W. W. Parker, Thomas J. Riddell, and Jacob Michaux, of Richmond; Dr. J. Edgar Chancellor, of the University of Virginia; Dr. T. James Taylor, of Brunswick County; Dr. J. E. Copeland, of Rectortown; Dr. E. T. Brady, of Marion; and Dr. Jacob Simmons, of Obenshain.

During the afternoon the election of officers for the ensuing year took place. The following were elected:

President.—Dr. William W. Parker, of Richmond.

Vice-Presidents.—Drs. J. W. Dillard, of Lynchburg; Jacob Michaux, of Richmond; and H. M. Patterson, of Staunton.

Recording Secretary.—Dr. Landon B. Edwards, of Richmond.

Corresponding Secretary.—Dr. J. F. Winn, of Richmond.

Treasurer.—Dr. Richard T. Styll, of Hollins.

The committees remain about as they were, except that ex-President Hunter McGuire, of Richmond, was made Chairman of the Executive Committee, in place of Dr. Parker, elected President.

Dr. Charles M. Blackford, of Lynchburg, was appointed to deliver the Address to the Public and Profession, in 1891.

Acute Dysentery was selected as the subject for general discussion, which will be opened by Dr. P. B. Green, of Wytheville.

Dr. A. C. Palmer, of Norfolk, was nominated to the Governor of Virginia to fill a vacancy occasioned by

the resignation of a member of the State Medical Examining Board.

On nomination by Dr. Blackford, of Staunton, Lynchburg was chosen as the place for the next annual session; the time of meeting, October, 1891; the day to be fixed by the Executive Committee.

EVENING SESSION.

The evening session was devoted to the section on Ophthalmology, Otology, and Laryngology.

DR. ROBERT L. RANDOLPH, of Baltimore, the reporter on the progress of Ophthalmology, spoke of the new treatment of detached retina by injection of tincture of iodine, and of the value of fluorescein as an aid in the diagnosis of corneal lesions. He also narrated some experiments of his own and of Kolinski's, with reference to the production of cataract in the lower animals by feeding them on naphthalin.

DR. WILLIAM F. MERCER, of Richmond, the reporter on the progress of Otology and Laryngology, spoke of investigations as to the transformation of benign laryngeal growths into malignant growths due to intra-laryngeal operations; the early treatment of naso-pharyngeal and throat affections in young children as a cure or preventive of certain nervous troubles; of nasal intubation as an easy and ready cure of hypertrophy of the soft intranasal tissues and deviations of nasal septa; and of the easy diagnosis of abscess of the antrum by illumination of the maxillary bones by an electric lamp introduced into the mouth. He also spoke of the importance of early recognition and treatment of acute suppurative otitis media following scarlatina.

DR. JOSEPH A. WHITE, of Richmond, Va., read an interesting and valuable paper on the

IMPORTANCE OF NASAL SURGERY AND NASAL THERAPEUTICS IN THE TREATMENT OF AURAL CATARRH.

He also presented a paper by title on the

RELATIONS OF REFRACTIVE ERRORS AND MUSCULAR DEFECTS IN ASTHENOPSIA, OCULAR HEADACHES, ETC.

DR. CHARLES M. SHIELDS, of Richmond, read a paper entitled

WHEN SHALL WE OPERATE FOR CATARACT AND STRABISMUS?

He said that a large proportion of cases of cataract in children are zonular, and that an operation is too often postponed until the retina has lost its functional activity. He referred to five cases in his practice, in three of which operation was deferred till the patients were between ten and thirteen years old, but with unsatisfactory results; whereas in two cases—one three years and the other six months old—the results were very satisfactory. As to the age for alternating-strabismus operations, six or seven years is proper; but in the unilateral form of strabismus the earlier the operation the better.

DR. ALEXANDER DUANE, of Norfolk, read a paper on the

MODERN TREATMENT OF STRABISMUS,

contrasting the old methods with the precision of modern operations. Carefully and repeatedly test, he said, the static and dynamic condition of the eyes before oper-

ating. In spastic, in periodic accommodative, and in some cases of paralytic squint, treatment of the cause is required; in concomitant and in other cases of paralytic squint an operation is called for. In concomitant strabismus he made a sharp distinction between cases with tendon-tension and those with tendon-relaxation—in the latter advancement, in the former tenotomy being required. He described a remarkable instance of tendon-relaxation in which an apparently divergent squint was immediately benefited by advancement of the external rectus. In paralytic squint he has employed, whenever possible, tenotomy of the antagonistic muscle as recommended by v. Graefe, and, in paralysis of the superior and inferior rectus, advancement of the affected muscle.

DR. JOHN HERBERT CLAIBORNE, JR., of New York City, forwarded a paper on

BOILS IN THE EAR,

of which the following is a summary: (1) Furunculosis of the external canal is a local disease. (2) The cause is infection by pyogenic microbes. (3) Treatment should consist in local antiseptics, such as applications of solutions of boric and carbolic acids, moist heat, and incisions of the furuncles when they point.

DR. LAURENCE TURNBULL, of Philadelphia, forwarded a paper entitled

CATARRHAL OTITIS MEDIA,

in which he condemned most of the so-called hearing-restorers or artificial drums. The only form of artificial covering suited to diseased perforations of the drum-membrane is, he said, delicate gauze or rubber, charged with an antiseptic solution to protect the ear from floating microbes and from temperature-changes. As to the treatment of chronic aural catarrh, in addition to the means mentioned in his book, he suggested, in suitable cases, massage of the ears, valerianate of strychnine, and residence in an elevated region.

DR. CHARLES M. BLACKFORD, of Lynchburg, then described a

NEW METHOD OF LIFTING THE EPIGLOTTIS,

which was devised by Dr. Samuel P. Preston, of Lynchburg. He uses an ordinary silver laryngeal probe, which is bent at a right angle half an inch from the end. Through rings soldered to the shaft the third and fourth fingers of the left hand are passed. Let the bent portion of the probe press down on the glosso-epiglottidean ligaments, so as to tighten them, and this tightening will elevate the epiglottis. The pressure should be gentle.

DR. ALFRED C. PALMER, of Norfolk, described in a short paper a new method of treating deformities of the eyelids, which he termed

PALPO-TRACTION.

He claimed that many distortions of the eyelids might be permanently improved by this conservative plan, but said that it must be applied in infancy when the tissues are pliable and easily moulded by manipulation. He asked obstetricians to pay strict attention to the formation of the lids of newborn infants, and in all forms of entropion, ptosis, and contracted palpebral fissures, to begin at once to shape the lids and retract them to their proper forms and positions.

THIRD DAY.

The Section on Obstetrics and Diseases of Women and Children being called to order, DR. I. S. STONE, of Lincoln, read a brief paper on the

DIAGNOSIS OF PELVIC DISEASE, AND WHEN TO OPERATE.

He said that the profession is united in advising operation for pelvic and abdominal tumors, extra-uterine pregnancy, pyosalpinx, etc., and that electricity in such conditions is hazardous. Salpingitis in country practice is a common result of puerperal diseases, but its symptoms so closely resemble those of pelvic peritonitis and cellulitis as to render the diagnosis impossible. Gonorrhœa is rare in the country, and, therefore, pyosalpinx is not as frequent as in cities. The impossibility of determining the extent of pelvic diseases, and the complications, are the real dangers of operations. He spoke of tubercular salpingitis, and remarked that the cause of each case of pelvic disease should be investigated before deciding to operate. Many cases are aggravated by marriage.

In discussing the paper, DR. GEORGE TUCKER HARRISON, of New York, said that Dr. Stone treated puerperal malarial fever as too trivial a disease. It is a common complication or sequel of labor, although it is not always easy to determine the cause. It may occur even after a perfectly aseptic delivery, lasts for weeks or months, and is often followed by rheumatism. As to the removal of the uterine appendages, operations are often undertaken without a diagnosis having been made. No radical operation should be undertaken until every other means of relief has been tried, unless, of course, it is plain that the organs are structurally diseased. As to extra-uterine pregnancy, the operation should be performed early. Tait confounds hæmatocele and hæmatoma with extra-uterine pregnancy in his writings on the diagnosis of the condition.

DR. JOSEPH PRICE, of Philadelphia, wished to emphasize Dr. Harrison's remarks as to operations upon the female pelvis. They should be undertaken only for an objective disease. Pelvic surgery has also suffered because many operations have been imperfectly done. The mortality from abdominal section for ovarian, tubal, and uterine diseases has been reduced to about two per cent., and the results of McGuire's suprapubic cystotomies conclusively show that simply opening the abdomen should not prove fatal. Dr. Coe, he said, had made some drawings of pus-tubes which are influencing professional opinion and action, but the drawings are unfortunately not true to nature. Dr. Price said that if the presence of pus in the tubes or pelvic cavity can be determined, it should be evacuated, as from any other part of the body. He advises that all forms of fibroids, even if small, be extirpated. Battey's operation, so far as it implies "normal ovariectomy," he said, should be consigned to oblivion. Dr. Price also condemns tampering with so-called intra-uterine medication by curettes, caustics, electricity, and sounds, and said that Emmet has not passed a sound for fifteen or twenty years. The palliative treatment of all intra-uterine diseases should be conducted on the most conservative principles. More prominence should be given to the ravages of gonorrhœa in unsuspecting wives as a cause

of disease. He then spoke of extra-uterine pregnancy, advising operation as soon as the condition is recognized. He has found rupture of the pregnant tube to occur almost invariably near one of the fimbriated extremities.

DR. HUNTER MCGUIRE corrected a statement of Dr. Harrison's. It was not Dr. Barker, but the late Dr. Otis F. Manson, of Richmond, who first described puerperal malarial fever.

With reference to the use of the uterine sound, Dr. McGuire said that he has never had the slightest reason to think that he has done harm by its use; on the contrary, he is sure he has often done good. As to Battey's operation, he believed that it would soon become obsolete. To take out a normal ovary for a neurotic trouble, hereafter, he thinks should be considered a crime. But when there are pathological changes in the organ, and when all other remedies have failed, then an operation to remove the ovaries or appendages, or anything in the female pelvis that is causing ill-health, is justifiable. He did not agree with Dr. Price that all fibroids should be removed.

DR. JOSEPH HOFFMAN, of Philadelphia, said that it is a mistake to suppose that more than about one per cent. of diseases of women are essentially cellulitis. Tubal pus-cavities are like links of sausage; hence, to open one does not open all.

DR. EDWIN RICKETTS, of Cincinnati, spoke of the history of abdominal sections, remarking that McDowell was born in Rockbridge County, Va., within a few miles of where the Society was assembled.

The tendency now, he said, is toward too much pelvic surgery, and it should never be forgotten that discredit comes upon surgery when the surgeon fails to make his diagnosis clear, and hence fails to give that benefit which the patient seeks.

DR. ISAIAH H. WHITE, of Richmond, spoke especially of the importance of an early diagnosis of extra-uterine pregnancy, in order that an operation may be performed in time to avert the dangers ahead. But some cases pass through the stage of rupture and collapse, and the products of conception remain in a quiescent state until some additional cause of inflammatory or ulcerative action takes place, as, for instance, the occurrence of pregnancy. There are many cases in which extra-uterine pregnancy is first discovered years after impregnation, by reason of the escape of foetal bones. Such cases suggest the propriety of the treatment recommended by some, viz., to kill the foetus by electricity as soon as the diagnosis is clear, allowing the mass to become encapsulated and remain in the abdomen. What are known as the "remnants" of an extra-uterine pregnancy—excluding, of course, the foetus itself—are most probably only the products of the inflammation excited by the passage of the foetus through the tube into the peritoneal cavity. The appearance of the tube in cases of pyosalpinx, which reminds one of sausages, is due to the adhesive bands formed around the tube. Dr. McGuire was undoubtedly correct in deploring the so-called normal ovariectomy.

DR. LANDON CARTER GRAY, of New York, in response to requests for remarks, condemned Battey's operation for the cure of nervous diseases, just as he did Baker Brown's clitoridectomies, Sayre's wholesale circum-

cisions, and Stevens's general cutting of eye-muscles. In nearly all the cases in which such mutilations have been resorted to for the cure of nervous diseases, the relief that has followed in some cases has been of too short duration to justify the operations. These operations do good only upon the theory of mental impression. Esquirol recorded his tests as long ago as 1828, and why they are ignored now by men high in the profession Dr. Gray could not understand. Esquirol divided his epileptic patients into groups. To one group he gave one class of remedies, with the strong adjuvant of mental impression as to the benefit that would result; to a second group he gave another class of drugs, with the same adjuvant of mental encouragement; while to a third group he gave colored water, but with the same encouragements. Each group of cases did about equally well for a time; but relapses soon began to occur, and all the cases finally relapsed to their former condition. If an operation is to be performed simply to get the benefit of mental impression, let that operation be as slight as possible.

DR. WILLIAM W. PARKER, of Richmond, could not lay aside the education of a large experience which taught him that intra-uterine injections are perfectly safe if proper precautions are observed.

DR. HARRISON did not wish to put himself on record as wholly opposed to Battey's operation; for there are serious nervous troubles in which, although the ovaries are apparently only moderately diseased, the patient is permanently relieved, if not cured, by the operation. Dr. Battey's original error—which, however, has long since been corrected—consisted in naming his operation "normal ovariectomy."

DR. STONE, in closing the discussion, said that, in his opinion, the so-called Barker's, but more properly, Manson's, puerperal malarial fever is usually only an evidence of pus in the Fallopian tube, although he would not deny the existence of a pure type of the disease, such as Dr. Manson, and, later, Dr. Barker, have described as puerperal malarial fever. As to Battey's operation, he has undertaken it but once, and the results were very unsatisfactory in what he thought was a well-selected case.

In the section on Practice of Medicine papers by Drs. William H. Bramlett, of Pulaski City; William R. Cushing, of Dublin; P. B. Green, of Wytheville; William W. Parker, of Richmond, and others were read by title.

DR. LANDON CARTER GRAY read a paper on

VERTIGO,

in which, after detailing the various forms of vertigo from organic disease of the nervous system, he spoke at length of the vertigo to which Murchison gave the name of lithæmic. He stated that he has reached the conclusion that this is due to imperfect digestion of the nitrogenized or farinaceous articles of diet, and that it should be treated principally by aiding the digestion and by hepatic stimulants.

Dr. Joseph T. Logan, of Atlanta, Ga., was then elected an Honorary Fellow of the Society, and the elected officers were installed.

AFTERNOON SESSION.

DR. GEORGE B. JOHNSTON, of Richmond, described a method of securing

PERMANENT DRAINAGE OF THE MALE BLADDER BY A RETAINED CATHETER INTRODUCED ABOVE THE PUBES.

He adds to Van Buren's trocar and canula a steel guide twice the length of the trocar, over which the outer canula may be easily withdrawn from the bladder and replaced.

DR. JOSEPH PRICE, of Philadelphia, followed with a paper on

THE PRESENT STATUS OF ABDOMINAL SURGERY.

He insisted that it was the duty of the surgeon to prepare himself for the unexpected when he undertakes abdominal operations. Vaginal punctures, he said, are more dangerous than incisions through the abdominal wall. As to ectopic pregnancy an operation should be performed as soon as the condition is discovered. The placenta should be removed, if possible; if not, it should be emptied of blood and the cord tied, after which it may be digested by the peritoneum. Flushing the abdomen with hot water in abdominal section is beneficial if there is a tendency to shock. He does not use antiseptics but depends upon cleanliness. As to treatment after such operations he allows neither food nor drink until the stomach becomes quiet; then gives small quantities of liquid diet—butter-milk being excellent. The patient should be kept in bed at least three weeks after an abdominal section.

DR. EDWIN RICKETTS, of Cincinnati, then read a paper entitled

EARLY EXPLORATORY INCISION AS AN AID TO THE DIAGNOSIS OF SOME SURGICAL DISEASES OF THE ABDOMINAL CAVITY,

in which he said that he had found it difficult in many cases to make a diagnosis previously to incision. To open the abdomen is easy enough, but afterward to do the best thing, and that promptly, bearing in mind that half-completed surgical procedures are rarely excusable, is often difficult. He then briefly reported eleven cases that had come under his observation, in which the diagnosis could not be made without an exploratory incision.

DR. HUNTER MCGUIRE, of Richmond, then reported a number of cases of

DISEASES OF THE BRAIN AND SPINAL CORD FOLLOWING URETHRAL STRICTURE.

He believes that long-existing urethral strictures are often followed by painful and dangerous neuroses.

DR. JOSEPH HOFFMAN, of Philadelphia, then read a paper entitled

THE SALIENT POINTS IN APPENDICITIS—ITS DIAGNOSIS AND TREATMENT.

He pointed out that a purely physiological rotation of the cæcum may excite congestion without the presence of any irritating matter whatever. As to treatment, those surgeons who operate between attacks represent the progressive surgery of the day. In women, it is usually best to cut through the median line, for the chances are that in them the disease will not be found in the vermiform appendix, and through the median incision any other abdominal operation may be performed. He condemned exploratory incisions. In man, the presence of an indurated mass in the right iliac fossa, with pain and

fulness in the region detected by rectal examination, is important. The right leg is also often drawn up.

DR. M. D. HOGE, JR., of Richmond, then read a paper on the

MODERN TREATMENT OF EPILEPSY.

DR. E. M. MAGRUDER, of Charlottesville, reported a CASE OF REMOVAL OF A LARGE VESICAL CALCULUS (ABOUT 2×3 INCHES) THROUGH THE VAGINAL WALL.

EVENING SESSION.

DR. GEORGE TUCKER HARRISON, of New York, read a paper entitled

REMARKS UPON ANTEFLEXION OF THE UTERUS.

After describing normal changes in the shape and position of the uterus, he stated that pathological anteflexion is simply the stability of the flexion. When metritis attacks an anteflexed uterus the angle of which had been variable up to that time, it becomes fixed. The usual symptoms of anteflexion are dysmenorrhœa and sterility—the dysmenorrhœa being due to associated metritis; and the sterility to the endometritis. If these inflammations be removed before they have caused permanent pathological changes, conception may take place. As to treatment, the peri- and para-metric inflammations should be removed. If the uterus becomes sensitive it should be scarified just before menstruation, and the dysmenorrhœa will be moderated. For the persistent uterine catarrh, after dilating the uterine cavity with aseptic laminaria tents and then by steel dilators, the uterine cavity should be washed out with a solution of carbolic acid. Lately, he has been much pleased with ichthyol, incorporated with lanolin, and applied around the portio vaginalis, as an aid in clearing up old peri- and para-metric adhesions.

Following this paper, Dr. L. Ashton, who is about to remove to Dallas, Texas, was elected an Honorary Fellow. Dr. Ashton has been an influential working member of the Society for many years, a Vice-President, a member of the Medical Examining Board of Virginia, and has contributed a number of papers during his many years of Fellowship. The retiring President, Dr. Oscar Wiley, of Salem, was also elected an Honorary Fellow.

CORRESPONDENCE.

CEPHALHÆMATOMA.

To the Editor of THE MEDICAL NEWS,

SIR: IN THE MEDICAL NEWS of September 6, 1890, Dr. H. A. Kelly, writing of cephalhæmatoma, says: "Few men outside of the ranks of the pure specialists are aware that such a disease as cephalhæmatoma exists. Cases which occur in the practice of the general practitioner are diagnosed and treated by him upon 'general principles.' The information which he possesses upon this subject is fairly comparable to that of a physician practising early in the last century." In THE NEWS of September 13th, Dr. Barton C. Hirst says: "A cephalhæmatoma on either parietal bone in a newly-born infant is quite common. There is probably not a general practitioner of any experience in obstetrics who has not become familiar with it."

Now, each of these gentlemen is a teacher in a leading medical college, and an authority in the obstetric art. A general practitioner who has seen and diagnosed cephalhæmatoma from specific knowledge of the condition asks, Which one is more nearly correct? Is the general practitioner of this day as ignorant as the opinion of Dr. Kelly indicates?

In Condie's work on *Diseases of Children*, a well-known text-book of twenty-five years ago, is a full account of this condition, he devoting some six pages to its consideration. In the latest American work on diseases of children—*Keating's Cyclopædia*—Professor Parvin evidently considers one page sufficient.

It is true, however, that in most of the text-books on obstetrics there is little or no mention of the subject.

In Volume III. of *Holmes's Surgery*, Mr. Holmes, writing of sub-aponeurotic extravasations of the scalp, shows the difference between them and cephalhæmatoma, and further says "that the same ridge bounding a small circumscribed collection of fluid is also familiar to surgeons as a frequent symptom in blows on the head, and a frequent cause of mistake to inexperienced observers, who confound these appearances with those of depressed fracture." So even the surgeons seem to be familiar with cephalhæmatoma.

Respectfully,
W. H. SHARP, M.D.

PARKERSBURG, W. VA.

NEWS ITEMS.

Fire in a Texas Insane Asylum.—On the night of September 18th the Insane Asylum at Austin, Texas, was partly burned. No lives were lost, but the inmates of one of the female wards were asleep at the time, and were with difficulty rescued before the building was destroyed. A laundry was attached to the ward, and it was there that the fire originated.

The Chair of Chemistry in the Chicago College of Physicians and Surgeons.—James A. Lydston, M.D., Ph. G., late chief of the Eye and Ear Department, Pension Bureau, Washington, D. C., has been elected to the Chair of Chemistry of the Chicago College of Physicians and Surgeons.

Honor to Sir Joseph Lister.—The Cameron prize in therapeutics of the Edinburgh University has been awarded to Sir Joseph Lister for his development of the antiseptic system of surgery. Mr. Lister will deliver an address before the University during the approaching session, in which he will sum up the results of his labors in recent years.

Influenza in Germany.—It is said that influenza has broken out again in parts of Germany, and that pneumonia is a very frequent complication.

Experiments on an Executed Criminal.—According to the *Lancet*, some interesting observations were recently made in Paris on the body of a criminal who had been guillotined. The heart continued to beat for more than six minutes, and experiments were performed to determine the independence of ventricular and auricular contrac-

